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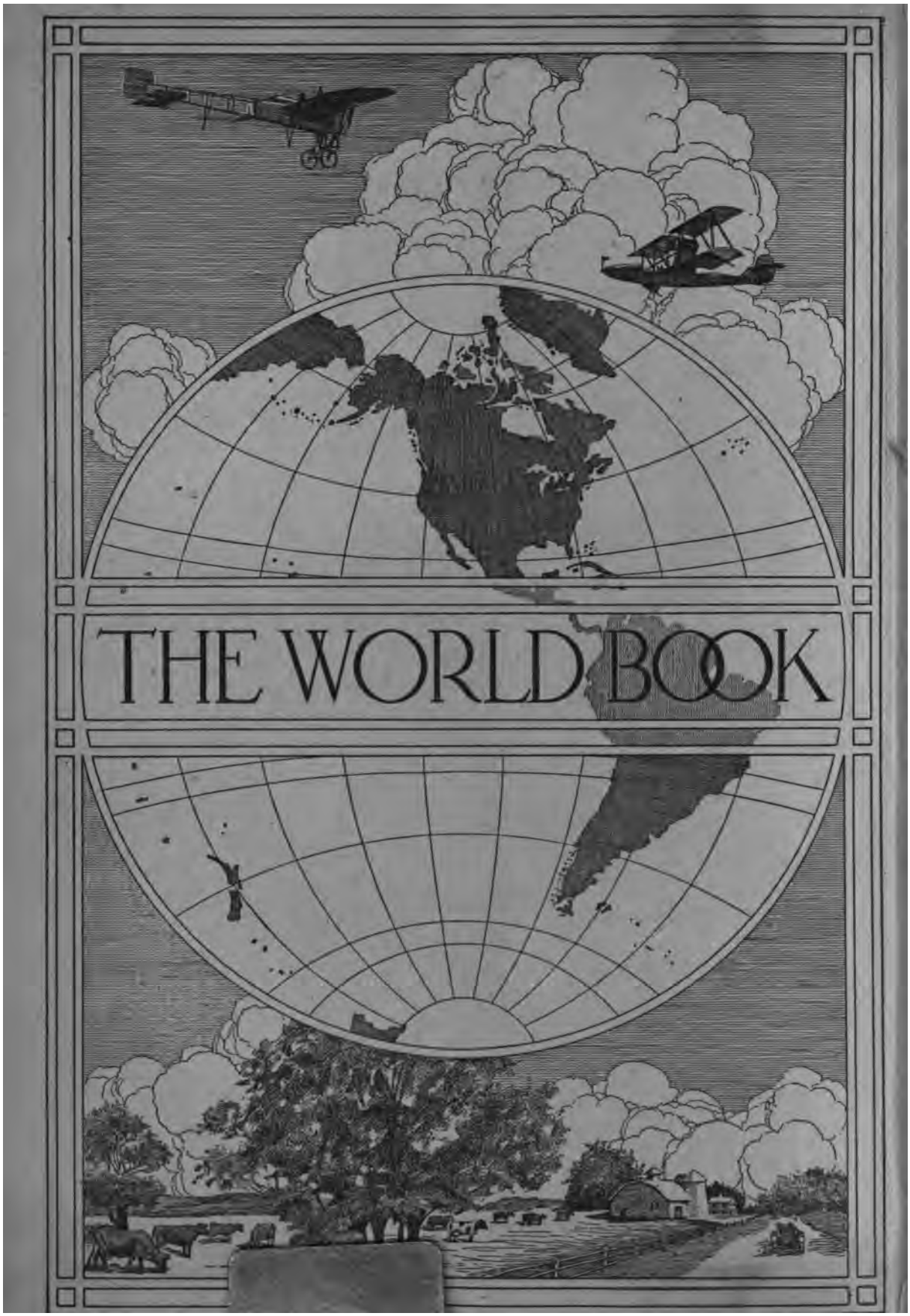
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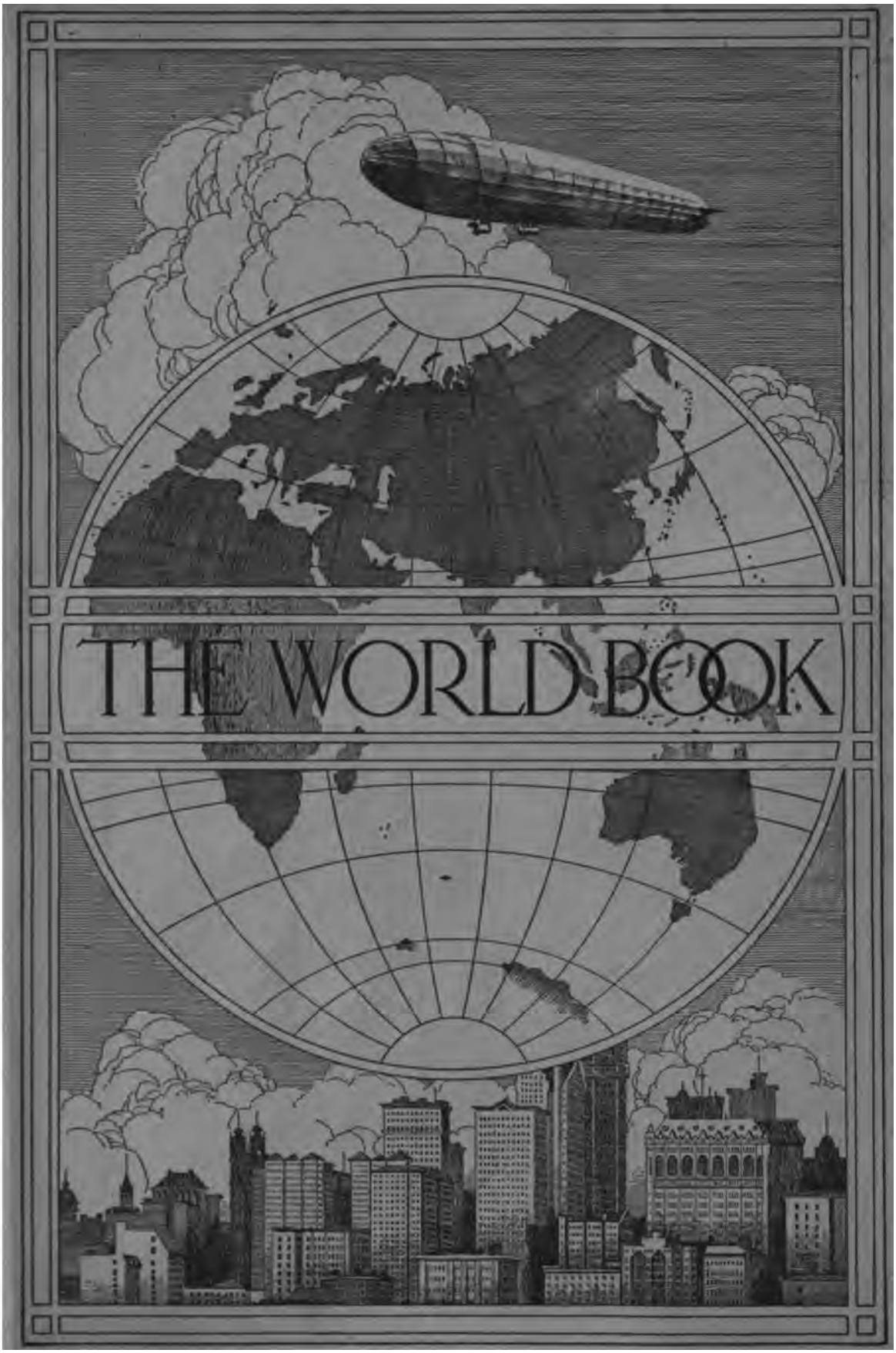
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VOLUME FOUR

GLOVE, *gluv,* a covering for the hand used by mankind since the days of ancient Cave Dwellers. The word is derived from the Anglo-Saxon *glof,* or *loof,* meaning the *palm of the hand.* Gloves are made of leather, the skins of sheep, calves, lambs, kids, dogs, rats, kangaroos, and also of silk, cotton, canvas and worsted. All kinds of leather or kid for glove-making are treated differently from leathers for other purposes; the object sought in dressing and tanning the skin is to make it soft and pliable. The leather is usually cut by dies and sewn by machinery. Silk, cotton and worsted gloves are sometimes knitted, but more often are cut from pieces of woven fabric and sewn together. In the manufacture of men's gloves the United States leads the world, but France is supreme in the production of the finer kinds of women's gloves. The name *kid,* commonly applied to gloves of soft, thin leather, does not imply that such gloves are made of kid skin. The number of kid-gloves produced annually is far in excess of the supply of any one kind of leather. The term *dog-skin* is also applied to gloves made of sheep-skin, and relates only to the finish of the leather. Suede gloves are made with the inside of the skin forming the outside of the glove.

The state of New York is the center of the American glove industry. Glovemakers from Scotland were induced to settle on lands in Fulton County granted to them by Sir William Johnson in 1760. From that date glove-making has been the principal occupation of the inhabitants of that section. One city, Gloversville, so called on account of the number of its glove-making establishments, annually produces gloves to the value of $9,000,000, the output of the entire county being valued at over $14,000,000. In Canada the yearly production is valued at about $3,000,000, divided between Ontario and Quebec. The glove-making industry has been little developed in Western Canada.

Among the Greeks gloves were worn as a protection to the hands when doing rough work. The Romans used them as ornaments and as a sign of rank. In the days of chivalry knights often wore ladies' gloves fastened to their helmets as signs of favor. Gloves were also regarded as battle gages, to be thrown down by a challenger and picked up by one accepting the invitation to fight. To shake hands while wearing a glove, and not to extend the bare hand of fellowship, was in the days of knighthood regarded as an insult or challenge, as signifying a desire to meet in combat. At the present day it is not regarded as correct form to offer a gloved hand to be shaken; when such an act is necessary an apology should be offered.

Consult Redmond's *The Leather Glove Industry;* Beck's *Gloves: Their Annals and Associations.*

GLOVERSVILLE, *gluv'erz vil,* N. Y., a city in Fulton County, in the east-central part of the state, fifty miles northwest of Albany and fifty miles east of Syracuse. It is on the Fonda, Johnstown & Gloversville Railroad and has an electric interurban line to Schenectady. In 1910 the population was 20,690; in 1916 it was 22,082, by Federal estimate. The area is four square miles.

Gloversville leads all other United States cities in the manufacture of gloves, and together with Johnstown, a short distance south, controls a large per cent of the entire production of gloves in America. In addition to glove and mitten-making, the city has large leather-dressing plants, and manufactories of pocket-books and leather novelties. Much of the work is let out to home workers. The city is situated at the foot of the Adirondack Mountains. It has a Federal building, erected at a cost of $100,000; a state armory, Y. M. C. A. building, Old Ladies' Home, Carnegie Library and the Nathan Littauer Hospital. A tubercular hospital, maintained by the county, is three miles north of the city.

Gloversville was settled about the time of the War of Independence, and was known as

Stump City until 1823. It was incorporated as a village in 1851; as a city in 1890. L.S.R.

GLOWWORM, another name for the firefly (which see).

GLOXINIA, *glok sin'i a,* a popular greenhouse plant, remarkable for its richly-colored, velvety leaves and large, graceful, delicately-tinted flowers. Although a native of tropical America, the gloxinia is now cultivated in

GLOXINIA

houses and gardens throughout America. It is a delicate plant requiring a light soil and careful watering, but the beauty of its lovely bell-shaped flowers and soft leaves will repay any amount of thought and effort.

GLUCK, *glook,* ALMA (1886-), one of the world's greatest prima donnas, whose voice has been pronounced of the same exquisite soprano type as Melba's. Although born in Bucharest, Rumania, Mme. Gluck is essentially American, for her parents brought her to the United States when she was six years old. Most of her musical education was obtained in America, and she is noteworthy as being a grand opera singer of first rank who was not trained in Europe. In private life she is MRS. EFREM ZIMBALIST, wife of a Russian violinist who has achieved fame. She attained immediate success upon her first appearance in New York City, with the Metropolitan Opera Company, as Sophie in *Werther.* Later she repeated her American triumphs when she made her debut in London. In addition to many appearances in concert, she has sung leading rôles in *Boheme, Orfeo, Bartered Bride, Faust* and other operas. In 1917 she was prevented by war from filling American engagements.

GLUCK, CHRISTOPH WILLIBALD (1714-1787), a musical composer who stands with Wagner as a reformer of opera. In the dedication of one of his finest operas he wrote: "Music should in opera occupy towards poetry the same relation as is held by a color scheme and *chiaroscuro* towards a fine drawing; that is to say, to add life to its figures without injuring their outline." This ideal he always strove to attain.

He had little musical education in his home town in Bavaria. In 1740 he composed *Artaserse,* his first opera, for the court theater of Milan, which was well received, despite the innovations of style which he introduced. However, the appearance later in Vienna of his operas *Orfeo ed Euridice, Alceste* and *Paride ed Elena* marked the birth of the so-called music-drama; they carried into practice his theory of opera as a national and coherent form of art. The crucial point of his career was at the production of *Iphigénie en Aulide,* in Paris in 1774, at the same time with one of the same libretto by Piccinni, the Italian composer and master of the "old" school of opera. All Paris took sides, but the victory was with Gluck.

In his greatest opera, *Iphigénie en Tauride,* he included all that was best in his five other great works. He composed fifty-four dramatic works in all. From Handel's music he drew inspiration, which he gratefully acknowledged to the end of his days. Gluck's temperament was a combination of vanity and impetuosity, coupled with a sincere love for his art and a generous appreciation of the good work of his fellow composers.

GLUCOSE, *gloo'kose,* a sugary syrup obtained from corn, about half as sweet as cane sugar. It is made by treating the starch with sulphuric or hydrochloric acid, greatly diluted. The syrup is called glucose and the more solid product, grape sugar. There are eighteen processes required in the manufacture of glucose, the whole taking about eighty hours. The corn is first steeped, then ground in water, and the starch, after settling, is washed and cleaned with hydrochloric acid in closed vessels called converters. The action of the acid is then neutralized by chalk or other alkali, and a long process of filtration follows. The liquid becomes thick and syrupy after the final treatment, and grape sugar results if the converting process is carried still further. Glucose is now put to many uses. Because it does not crystallize it is used in the preserving

industry extensively. It is also used freely in the making of candy and for mixing with cane-sugar molasses for table uses. It is likewise used as a substitute for malt in brewing.

Since 1890 the manufacture of glucose has become a great industry in the United States and to some extent in Canada, and the process has so greatly improved that forty pounds of glucose are now made from one bushel of corn, while formerly only twenty-six to thirty pounds were obtained. See CORN.

GLUE, *gloo,* an impure gelatin, best known as the substance which holds pieces of wood, such as furniture, together. It is also an adhesive for other materials than wood, principally leather and paper, and as sizing it gives glaze to fabrics and paper. The finest in the world, which comes from France, is used by straw-hat makers. The name is sometimes applied to adhesives which do not contain gelatin, especially marine glue.

Glue is derived from the hides, hoofs, horns, bones and sinews of animals. The very best American glue is from sinews. In England bone-glue making is still important, but in America the more difficult manufacture of hide glue has largely taken its place. After a chemical process which includes boiling, a jelly is obtained, which, with further refinement and drying in rooms of carefully regulated temperature, becomes the brittle glue of commerce. This, when dissolved in hot water, gives a cement that will withstand several hundred pounds of strain. Glue heated too long, or more than once, is weakened. Marine glue is useful principally to shipbuilders. It is usually composed of India rubber, naphtha and powdered shellac.

Glue Industry. The glue industry in America began with Peter Cooper in 1827. The annual product is worth about $15,000,000, though there are fewer establishments than in 1880, when $4,000,000 was the average annual value. The tendency is for the manufacture to center near the large stockyards of the Middle West, and the larger packing firms have their own factories.

GLUTEN, *gloo'ten,* a tough, sticky, somewhat elastic and almost tasteless substance of a grayish-yellow color, found in wheat and other cereal grains. It is a vegetable albumin (see ALBUMEN), and its presence in cereals is important because it is almost the only substance in these foods that contains nitrogen. Gluten may be obtained from the flour of wheat by filling a muslin bag with flour and kneading it under running water. In this operation the starch of the flour will be washed away in a milky stream, the gluten remaining in the bag as a sticky mass.

It is the gluten in flour that makes bread dough stick together, and this stickiness is utilized in the making of flour paste. Gluten bread and biscuits are prescribed for those suffering from diabetes (which see). Wheat which contains a high percentage of gluten is used in the manufacture of macaroni (which see). On an average there are eight pounds of gluten in one hundred pounds of wheat flour. See FOOD, subhead *Chemistry of Food.*

GLUTTON, *glut''n,* the English name for the European carnivorous, or flesh-eating, animal which is known in the United States as the *wolverine.* It belongs to the weasel family, but is entirely different in appearance,

GLUTTON, OR WOLVERINE

being heavily built and about two and one-half feet in length. The glutton is said to be the most powerful animal for its size in existence, and it is noted for its enormous appetite. It devours large numbers of young foxes and is also an enemy to beavers. The fur is dark brown or almost black, sometimes having white markings, and is of some commercial value.

GLYCERINE, also spelled **GLYCERIN,** *glis'ur in,* a colorless, odorless, syrupy liquid of sweetish taste, employed extensively in the arts and in medicine. Glycerine is a by-product of the candle and soap industries. Its ultimate source is the fats and fatty oils found in plants and animals, such as cottonseed oil, lard and tallow. In the manufacture of stearin for candles, fats are treated with steam at a high temperature, and usually in the presence of a relatively-small quantity of some substance which will accelerate the action of steam upon the fat. (Lime and sulphuric acid are among these accelerating agents.) In soap-making, fats are boiled with alkalies. In the former industry one pound of glycerine is pro-

duced for every nine pounds of stearin; in the latter, one pound of glycerine for about eleven pounds of dry soap. The glycerine is purified by distillation in superheated steam. About 100,000 tons is the world's annual production.

Chemists prefer to call pure glycerine *glycerol;* good commercial glycerine is over ninety-nine per cent pure glycerol. At a low temperature glycerol sometimes solidifies into crystals, melting at 63° F., but this is rare, and just what is necessary to start the crystallization is not known. Ordinarily even the purest glycerine remains liquid, however cold it is kept. The boiling point, 552°, is very high for an organic compound. It is very hard to set glycerine on fire. It burns with a colorless flame without charring, and, if pure, leaves no ash. At the ordinary temperature glycerine does not evaporate. On the other hand, it absorbs moisture from the air; it will take up half its own weight of water in this way. These properties make it a very useful substance to add to materials to prevent their drying out. Among the commodities to which it is added for this purpose are tobacco, copra (shredded cocoanut), confectionery, heavily-starched cotton goods, and inks for rubber stamps. The tobacco industry of the United States consumes about 2,500 tons of glycerine a year.

Glycerine mixes with water and alcohol in all proportions and dissolves many inorganic and organic substances. Some dyes are dissolved in glycerine and then mixed with water. Stains made on linen by coffee and tea can be removed by moistening the material with glycerine, allowing it to stand for a time and then steaming or washing with soapy hot water. Glycerine added to water lowers its freezing point. For this reason it is sometimes used in gas meters, floating compasses and automobile radiators. Mixed with lead oxide it makes a good cement.

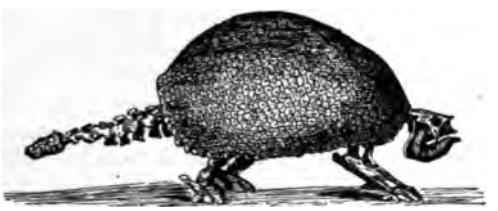
Glycerine feels oily and warm. The warmth is due to the mixing of the glycerine with water, which it extracts from the skin. It is used in medicine to allay inflammation, thus having a soothing effect. The same *emollient* property makes it useful as a cosmetic for chapped hands and sore lips. Taken internally in very small doses it is harmless. Larger doses have a purgative action and very large doses may even prove fatal. It is sometimes used as a solvent for other medicines. As a preservative, glycerine is sometimes applied to untanned hides and to meat.

The greatest industrial use of glycerine is for the manufacture of the powerful explosive, *nitroglycerine* (which see). See, also, ALCOHOL; EXPLOSIVES; FAT; SOAP.

GLYN, *glin,* ELINOR, an English novelist whose works have been widely read and much discussed because of their sensational character. Her early novels, of which the most noteworthy were *The Visits of Elizabeth* and *The Reflections of Ambrosine,* attracted no special attention, but *Three Weeks,* which appeared in 1907, was one of the most talked-of books of the decade. Later publications include *Elizabeth Visits America, The Reason Why* and *His Hour.* Most of Mrs. Glyn's works are unwholesome in tone, for they treat of sex questions in a morbid, unpleasant manner.

Mrs. Glyn is by birth a Canadian, the daughter of Douglas Sutherland of Toronto. Clayton Glyn, to whom she was married in 1892, is an Englishman, but they have always preferred to live in France.

GLYPTODON, *glip'toh don,* a gigantic extinct mammal, which was probably ten or twelve feet in length. Its fossil remains have been found in South America, and occasionally in the United States. It had a solid armor of



SKELETON OF THE GLYPTODON

jointed plates, arranged in transverse rows, and the head and tail were covered with similar plates. The character of its claws shows that the animal could not have burrowed, like the armadillo, although it is believed to have belonged to the same family.

GNAT, *nat,* a name given various "blood-thirsty," irritating insects, the most common being the mosquito. All gnats are two-winged; each is equipped with a long, sharp, sucking and piercing organ called a *proboscis* (which means *snout* or *trunk*). Most gnats lay their eggs on water, where they float three days and then hatch. If standing pools of water were removed, these irritating insects would be less numerous. The buffalo gnat is very annoying to domestic animals. In the northern woods an almost invisible gnat called the *punky* is a most troublesome pest; it is so tiny

the Indians have called it the "no-see-um." See MOSQUITO; HESSIAN FLY.

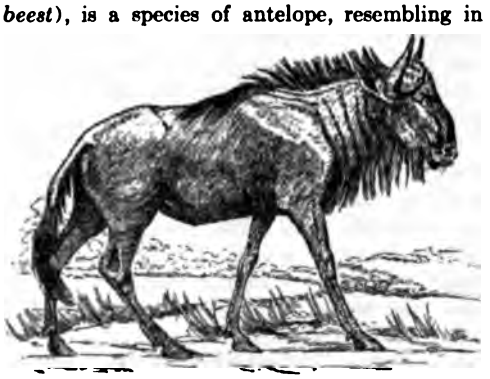
GNEISS, *nise.* Gneiss is granite, with the minerals comprising it—quartz, feldspar and mica—arranged in layers (see GRANITE). The layers may be straight or curved, and they may be very thick. The layers of mica are easily separated from the others. Much of this rock is rich in ores, and large quantities of gold, silver, copper, iron, antimony and cobalt are obtained from it. Like granite, it contains no fossils. Large crystals of feldspar are found in some varieties, which are known as *porphyritic* gneiss.

The only difference between gneiss and granite is in structure. The minerals forming granite are distributed without apparent order; in gneiss they are arranged in layers. Gneiss is found in large quantities in all mountain systems.

GNOMES, *nohmz.* In Norse mythology fairy dwarfs, called gnomes, guarded the mines and miners. The male gnomes, who were ugly and misshapen, were condemned to live underground all their lives, for if they appeared in daylight they were turned to stone. Under the leadership of Sindri they mined silver, gold and precious stones, besides serving as smiths for the gods. The women, who were very good and beautiful, were only a foot high, and were the special guardians of diamonds; occasionally some of them would creep out to torment man, if he had been wicked. Pope refers to the fabled gnomes in his *Rape of the Lock,* as in the following quotation:

> Swift on his sooty pinions flits the gnome
> And in a vapour reached the dismal dome.

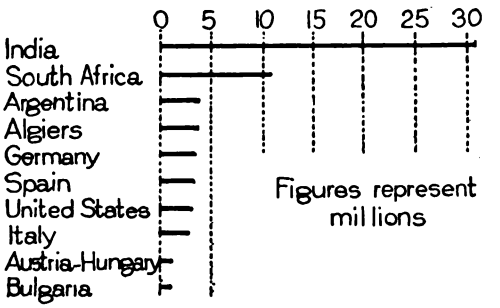
GNU, *nu* (from the Hottentot *gnu,* or *wildebeest*), is a species of antelope, resembling in



THE GNU

form the horse, the buffalo and the antelope. Both sexes have horns. There are two species —the common, or white-tailed variety, now practically extinct, and the brindled gnu, still to be found in the interior of Africa. They travel in herds of thirty or forty, and apparently are friendly with zebras and quaggas. In common with the buffalo and the bull, gnus are angered by the sight of scarlet. Their flesh is said to be palatable and nourishing.

GOAT, humorously called "the poor man's cow," is a member of the sheep family. It is a hardy animal and furnishes sweet, nourishing, health-giving milk, edible flesh and a very useful hide. It lives on food which other ani-



THE GOATS OF THE WORLD

mals will not touch. Though not quite the size of sheep, goats are stronger and less timid, and they move more quickly. They differ from sheep in that their hollow horns are erect and turned backward, their tails are shorter, and the male is generally bearded under the chin and has a peculiar odor. The male goat is sometimes called *billy goat;* the female, *nanny goat.* Wild goats live in mountains and rocky places. Domestic goats, thought to have originated from the wild Persian species, are found all over the world, great herds being kept in many parts of Europe, Asia and Africa. They are often trained to be pets and are harnessed to carts and driven by children. In many places they are used as beasts of burden.

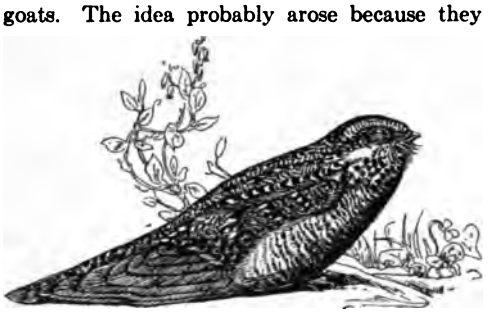
Although not highly esteemed in America and frequently the object of levity, the goat is a most valuable economic creature, for reasons given in the opening sentences of this article. Goat's milk nourishes more people, probably, than does cow's milk, throughout the world; those who become accustomed to the former will not of choice use the latter. For this reason, when natives of North Africa responded to France's call for soldiers in 1914 in the War of the Nations, it was necessary to maintain herds of goats near the fighting lines to furnish milk for them.

The *Angora goat* is a valuable spiral-horned, silky-haired species of goat. Only a few of these animals are found in Canada, but there are thousands in the United States. The soft, silvery-white hair, which hangs down in curly locks eight or nine inches long, is called *mohair,* and is used in various manufactures. (See MOHAIR.) The pelts are made into rugs, robes, muffs, capes, etc. Angora skins are worth from thirty-five cents to $3.50. The flesh is delicate and nutritious. These goats are wonderful grazers, clearing away weeds and brushwood. These and other species of goats furnish milk richer than cow's milk, and the inner hide is used for shoes, gloves, music rolls, book bindings, etc.

Goat Industry. Though the value of goats is recognized the industry in the United States has not yet grown large; particularly is there a shortage in goatskin for manufacturing purposes. In 1910 there were 2,798,160 goats of various kinds in the United States, valued at $5,964,812, Kansas City being the leading goat market. Still over $30,000,000 worth of goatskins are being imported into the United States each year from the British Indies, Southern Russia, South America and Mexico. The finest goatskins in the world are imported from the region of the Black and Caspian seas. Efforts are being made to encourage the goat industry in the United States, and to make it a paying one. See CASHMERE GOAT; ROCKY MOUNTAIN WHITE GOAT. M.S.

Consult Robertson's *The Case for the Goat.*

GOAT'SUCKER, a common name for a family of moth-catching, owl-like birds, the *nightjars.* The first name was given from an incorrect ancient belief that these birds milk goats. The idea probably arose because they



GOATSUCKER, OR NIGHTJAR

look for insects at twilight, searching near the ground and in pastures where domestic animals graze. The more appropriate name, nightjar, was derived from their night-flying habits and jarring cries.

Nightjars vary in size from eight to fifteen inches, and the soft plumage is in all shades of gray and brown, mottled with white. Members of this family are found almost everywhere. Representatives in America are the nighthawks and whip-poor-wills (which see). Other general characteristics of the goatsucker family are the short, thick head with large, gaping mouth and very small bill with bristles at the base. They catch their food while flying on wings which, considering the size of the bird, are long and powerful. They sleep throughout the brightest hours of the day, resting lengthwise on their perch or on their nest on the ground.

GOBI, *go'be,* DESERT OF, a treeless, dreary plateau rising 3,000 feet above sea level, in the central part of Mongolia, in Northern China. It has only a few permanent settlements, all located in the northern part of its territory. Over its sandy waste, which covers nearly 300,000 square miles, an area twice as large as Montana, are scattered many rocky table-lands and mountains, but in the summer a scanty rainfall makes enough pasturage for the flocks and herds of the wandering tribes. During the rest of the year the climate is very severe, especially along the borders. A number of caravan routes lead across this region from China proper to Siberia, and these are used largely by nomadic tribes. Several explorers, especially Przhevalski and Sven Hedin, have obtained much valuable information during the past fifty years concerning the Gobi. See DESERT; NOMAD LIFE; for location on map, see ASIA.

GOD, a name given, in its broadest sense, to any superhuman being who directs the activities of various races of the world. As used by Christian peoples, the term applies to only one Being, and the plural form *gods* is an impossibility. This article will consider both uses of the term.

The Heathen Gods. Every people, however barbarous, however little removed, apparently, from the brutes, seems to have some sort of an inborn idea of a being more powerful than man. Strangely enough—or so it seems to those acquainted with the Christian idea of God—this more powerful being is not necessarily *better* than man. The Greeks were a beauty-loving, virtue-loving people, and the myths they wove about their gods were in many instances exquisite, but fully as often these myths showed the gods to be cruel, vengeful or immoral (see MYTHOLOGY). Such tales

do not seem to have shaken the faith or allegiance of the worshipers. What wonder, then, since the Greeks, on their high plane of civilization, could invent for themselves such faulty deities, that the savage tribes often set up as objects of their worship beings which seem like devils rather than like gods? Some of these have not one redeeming virtue, but they are strong and very jealous, and the poor, frightened savages dare not falter in their worship for fear of dire punishment.

The Hebrew Idea of God. Most of the ancient peoples, like many of the moderns whom Christianity has not touched, believed in large numbers of gods. One had the sun as his especial charge; one the moon; one presided over birth and another over death. Each tribe, too, had its own gods, and when one tribe conquered another it was looked upon as proof that the gods of the conquerors were stronger than those of the vanquished. In the early history of the Hebrews they, too, looked upon their God as just a tribal deity who had no concern with the welfare of any people but the Hebrews, and who cared more for formal rites of worship than for any moral purity. Gradually the conception broadened, until God became the strong moral force in the national life and was looked upon as controlling other nations as well as Israel. It was still believed, however, that He governed the world only for Israel's good, and it was not until after the beginning of the Christian Era that a few enlightened men began to spread the idea that God was no respecter of nations, but was a loving father, caring for all peoples alike.

The Christian Idea. This universal character of God is one of the central ideas in the Christian conception. That He is a personality and not a mere force; that He is eternal, all-wise, all-powerful and all-loving; and that men may have a spiritual communication with Him—these are the chief qualities of the God of the Christians.

The discussion so far has touched merely upon various *conceptions* of God, but has said nothing as to His actual *existence*. Learned men from the beginning of the Christian Era have busied themselves over the question of the existence of God, and have brought forth various so-called proofs; but after all it is a matter incapable of the sort of proofs which material facts admit of. Theologians argue that it is evident in every phase of life that back of the universe there is a supreme *plan*, which must have been formed by a rational Being; that man himself, with his moral nature, implies a moral personality above him; and that it is incredible that this very highest conception of which man is capable—the conception which has led him to his greatest efforts and his finest achievements—should be but a figment of his own imagination. They also point out as proof of the existence of God the fact of design in nature; that is, the adaptation of all forms of life to their environment. Finally, the Christian holds fast to the revelation of God as given by Christ in the New Testament—a revelation which admits of no doubt.

These, briefly stated, are the chief arguments for the existence of God, but to them the atheist objects that they are not tangible proofs. And indeed, in the last instance, every man can but fall back on his own inner conviction, and on the generally admitted truth that a God who could be completely comprehended by a finite mind would really not be a God at all. A.MC C.

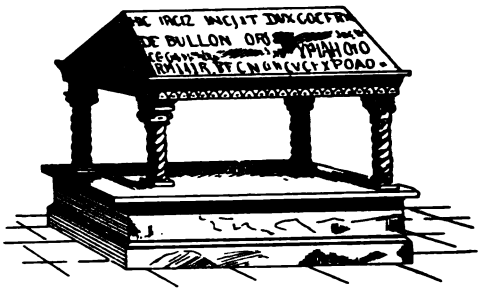
Related Subjects. The reader is referred to the following articles in these volumes:

Agnostic	Bible
Atheism	Jesus Christ

GODERICH, *god'ritch,* the county town of Huron County, Ontario, in the southwest part of the province and on Lake Huron, at the mouth of the Maitland River. Toronto, 134 miles to the southeast, and Guelph, eighty miles southeast, are connected with Goderich by branches of the Grand Trunk and the Canadian Pacific railways, and other branches of the Grand Trunk provide connection with London and Port Huron. Steamships running from Detroit and other lake ports make Goderich a port of call. The delightful climate of the vicinity has made Goderich best known, perhaps, as a summer resort, but it is also an important distributing and manufacturing center. Refined salt, leather, flour, dried apples, knitting machines and road machines are noteworthy products, and limestone and clay are found in the neighborhood. Electrical power is supplied from Niagara Falls. Population in 1911, 4,522; in 1916, about 5,200.

GODFREY DE BOUILLON, *de boo yoN'* (about 1060-1100), duke of Lorraine, was one of the foremost leaders of the First Crusade. After the conquest of Jerusalem, a Christian kingdom was founded, of which Godfrey was unanimously elected sovereign. However, he refused the kingly title and assumed the hum-

bler one of Baron and Defender of the Holy Sepulcher. During the single year of his rule, he was successful in repelling the Egyptian attack at Ascalon, and with the assistance of



HIS TOMB
It is in Jerusalem, and dates from about the year 1150.

others of the pilgrims he drew up from the various feudal statutes of Europe the elaborate medieval code of laws known as the *Assizes of Jerusalem.*

During one of his expeditions into the territory of the Moslems, he was visited by several emirs who expressed surprise at seeing their conqueror without a guard, in a common tent which boasted only of a small, rough bed such as was allotted to the humblest soldier in his train. Such was his simple mode of life. The minstrels sang of his valor, and the fairest ladies of his land wrought with loving fingers the devices upon his banner. He died at the age of forty, but in his short life won a name as one of the foremost representatives of the chivalry of his age.

GODI'VA, Lady. According to legend, Earl Leofric, lord of Coventry, was a stern and harsh feudal baron, who taxed the citizens of the town to the utmost. Lady Godiva, his wife, seeking to help the people, begged her husband to ease their burdens. "Ride naked through the town," said the Earl, "and I will grant your request." Lady Godiva issued a proclamation requesting everyone in the city to remain within doors on a certain day, and not even to look from their houses. Clothed only in her long hair, she mounted a white horse and rode through the streets. Legend further states that the only one who tried to see her was a tailor, who peeped through a hole in a shutter, and was immediately struck blind. This is the origin of the "Peeping Tom" tradition. Earl Leofric was true to his promise and gave great concessions to the townspeople. For centuries a fair was held at intervals to celebrate Godiva's heroism.

GOD SAVE THE KING, the national song of Great Britain. It dates from 1743, the year of the victory of George II over the French army at Dettingen, and is a prayer for the glory and happiness of the sovereign. The origin of the melody is obscure. It is variously attributed to John Bull, Lulli and Handel, although Henry Carey (a musician and poet born in London about 1696) is generally accredited as the author both of the words and the music. The song has spread across to the Continent in more or less altered form; in fact, Germany and Switzerland each claim it. The music was formerly used by Russia for its national air, while in the United States one of the most popular of patriotic songs, *My Country 'Tis of Thee,* which has become in effect a national hymn, is sung to it. The first stanza of the English song follows:

God save our gracious King,
Long live our noble King,
God save the King!
Send him victorious,
Happy and glorious,
Long to reign over us,
God save the King!

GOETHALS, *go'thalz,* George Washington (1858-), an American civil and military engineer, under whose efficient administration one of the most important projects of modern times, the Panama Canal, was brought to completion (see Panama Canal). He was born in Brooklyn, N. Y., and was educated at the College of the City of New York and at the United States Military Academy at West Point. On his graduation from the latter institution in 1880 he was appointed second lieutenant in the corps of engineers, and rose steadily in rank until he reached the grade of major-general, in March, 1915. His promotion from the grade of colonel to that of major-general was a fitting recognition of his genius as director of the great Panama enterprise.

GEORGE W. GOETHALS
Resourceful engineer, organizer and leader of men, whose lasting glory is connected with the building of the Panama Canal. He is now a major-general in the United States army.

Goethals was an instructor in civil and military engineering at West Point from 1885 to 1887, and he had charge of the construction of the Muscle Shoals locks and dams on the Tennessee River, which was completed in 1889. During the Spanish-American War (1898) he was lieutenant-colonel and chief of engineers of United States Volunteers; later his ability and energy won him an appointment to the board of fortifications in connection with the coast and harbor defense service.

In 1907 President Roosevelt brought him into national prominence by appointing him chairman, as well as chief engineer, of a commission to complete the Panama Canal. His management of the great enterprise, with its many problems and difficulties, was a striking illustration of what may be accomplished by a man of forceful personality, initiative and executive ability. The work was thoroughly organized and was carried on harmoniously and systematically; and the important questions of sanitation, housing and food, and the social organization of the Canal Zone were handled no less admirably. In accomplishing the task of making the Panama Canal Zone healthful the credit belongs to Surgeon-General Gorgas (which see). Though the work was scheduled to be completed on June 1, 1915, a vessel carrying passengers passed through the canal on August 15, 1914.

In February, 1914, when a permanent system of administration was organized, President Wilson appointed Goethals first civil governor of the Panama Canal Zone. This position he retained until 1916. In October of that year President Wilson appointed him chairman of a committee to investigate the operation of the Adamson Railroad Law.

In April, 1917, after accepting an invitation to construct a great system of highways for New Jersey, he was recalled to the Federal service to build a vast merchant marine for the United States as part of the plan of war against the German Empire.

GOETHE, *gö'te,* JOHANN WOLFGANG VON (1749-1832), a German poet, novelist, dramatist and philosopher, not only the most eminent figure in German literature, but one of the greatest geniuses the world has produced. Like Socrates, the Athenian, Shakespeare, the Englishman, and Dante, the Italian, he was endowed with genius of the universal order, for he was responsive to all the feelings and experiences that are common to humanity. He was distinguished for scientific attainments, for literary and artistic criticism, as a writer of fiction and as a dramatist, yet he made his happiest contributions to his country's literature in the field of lyric poetry. From his pen also came one of the most splendid achievements of his age, *Faust,* the greatest drama of the German people. On this he labored from early manhood until nearly the end of his career.

GOETHE

Goethe's *Faust* is more than a poetic and dramatic treatment of the old legend—the story of a weary scholar who sells himself to the Devil that he may taste the joys of youth and love (see FAUST). In it the reader will find a summary of the poet's own experience, and the expression of his philosophy of life. In the second part the drama becomes an allegory of human character and experience: it pictures a Faust who finds salvation in useful labor and who finally triumphs gloriously over the powers of darkness. This was the poet's "confession" of what life had taught him.

Goethe was born at Frankfort-on-the-Main on August 28, 1749. His early education was directed by his father and by private tutors, and at the age of sixteen he was sent to Leipzig to study law; there he varied the routine of school work by writing lyrics and studying art. After an illness which compelled him to return to Frankfort, he resumed his law studies at the University of Strassburg, and in 1771 received his degree. During his sojourn in Strassburg he formed a momentous friendship with the poet Johann Herder, who opened up to him the beauties of Shakespeare's writings, and taught him to love the old folk songs. Goethe's poems written at this time mark the beginning of a new era in German lyric poetry.

Between 1771 and 1775, a period in which he occupied himself as a lawyer at Frankfort and at Wetzlar, he wrote his first important drama, *Götz von Berlichingen,* and a novel, *The Sorrows of Werther,* the latter of which has immortalized one of his unhappy love affairs. In 1775 he was invited by Charles Augustus, the young Prince of Weimar, to become a member of his court at the capital of Saxony, and for

the next ten years he was deeply occupied with affairs of state, devoting himself to agriculture, horticulture, geology and mineralogy, and proving himself an able and conscientious minister whose grasp of practical affairs was astonishing. It was through this work that he came to love the study of natural science, to which he gave much attention during the last years of his life.

The years between 1786 and 1788 were spent in Italy. Coming there under the influence of classic art and literature, Goethe's own art became calmer and freer, and the unfinished dramas which he brought with him to Italy—*Iphigenie, Tasso, Egmont* and *Faust*—begun when he was under the spell of the Romantic movement (see ROMANTICISM), were completed in an entirely different spirit. Several unfruitful years followed his return to Weimar, where, in 1791, he was appointed director of the ducal theater. This post he held for twenty-six years. In 1794 there came a new influence into his life, the friendship of the poet Schiller. Stimulated by the latter's enthusiasm for literature, he completed in 1796 his most significant novel, *The Apprenticeship of Wilhelm Meister,* a story of theatrical life which contains one of his most charming lyrics, *Kennst du das Land?* The English translation of this beautiful song is familiar:

Know'st thou the land where the fair citron blows,
Where the bright orange midst the foliage glows,
Where soft winds greet us from azure skies,
Where silent myrtles, stately laurels rise,
Know'st thou it well?
'Tis there, 'tis there,
That I with thee, beloved one, would repair.

The next year Goethe published his epic of humble peasant life, *Hermann and Dorothea.* Several exquisite ballads followed, and in 1808, with the publication of the first part of *Faust,* he entered upon the final period of his literary career. These last years in Weimar saw the completion of a novel, *Elective Affinities;* his autobiography, *Truth and Fiction Relating to My Life;* a sequel to *Wilhelm Meister;* a collection of Oriental lyrics; and the second part of *Faust.* As he laid aside this monumental work, the year before his death, he said, "It is now really indifferent what I do, or if I do anything at all."

He died on March 22, 1832, and was buried in the ducal mausoleum, near the resting place of his friend and patron, Charles Augustus. The house in Weimar, which was his home for so many years, and the one in Frankfort where he was born, are preserved as memorials of him, and many of the important cities of Europe and the United States have erected statues in honor of this master-genius. See GERMAN LITERATURE. B.M.W.

GOITER, *goi'ter,* an enlargement of the thyroid gland, which is located nearly in the front of the neck. The disease may appear in the form of a small swelling, or it may produce a growth of large proportions, several inches deep. It is prevalent in many countries, but particularly in the mountainous regions of Switzerland and in Northern Italy, where lime formations abound. A general lack of nutrition, hardening of the tissues, and the habit of carrying heavy weights on the head, are some of the causes of goiter. One treatment of a certain form of the disease is the local and internal administration of small doses of iodine, but a physician should always determine whether this is the proper method to employ. The X-ray has also been successfully applied. Some authorities advise the entire removal of the goiter by operation, but this must be followed by the continued administration of thyroid lymph. The disease is seldom fatal.

GOLCONDA, *gol kon'da,* the ancient city of India which lay halfway between Madras and Bombay, famous in olden times for diamonds, which, however, were merely cut and polished there. The expression *richer than Golconda* became proverbial. The ruins of this city of the long ago are still famous for the ancient fortress, now used as a state prison, and for the gray-stone burial places of one-time rulers of the ancient kingdom of Golconda.

GOLD. So far as is known there has never been a time when this yellow metal has not been "the precious metal," more sought after than any other. All researches show that man knew of it before he knew of any other metal, and that it was everywhere, in a sense, the standard of value. The Assyrians and the Egyptians, the founders of the very oldest civilizations, expended their skill in fashioning ornaments from it; and what the ancient Hebrews thought of it is shown by the fact that it seemed the only thing with which they could compare those "precepts of the Lord" which were the greatest factor in their national life. "More to be desired are they than gold," chanted the psalmist; "yea, than much fine gold." Some of the Oriental peoples almost worshiped it, for was it not in its color and luster like the sun, the god of their idolatry?

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IN QUEST OF GOLD.

Above, miners at work in the Yukon district. Below, Bullhead mine, in the rich Colorado gold field.

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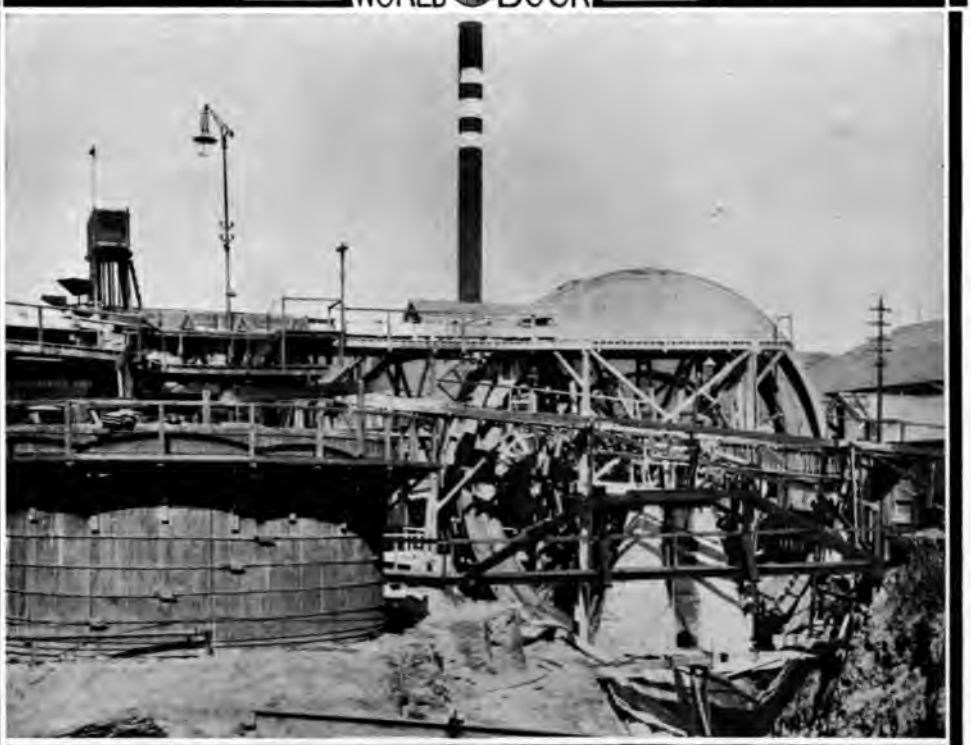


IN SOUTH AFRICA.

Above: Mill for crushing gold ore. Below: A section of a gold mine 2,100 feet underground. Both at Johannesburg.

In medieval times it played a great part in history, for a whole science was built around it—the science of *alchemy*. Gold was the most perfect substance in the world, the alchemists declared, and they used their science and their magic in vain attempts to find some means of turning other metals into it. With the growth of science and the understanding of the principles of chemical elements, it became clear that such transformation could not be brought about. The knowledge of the properties of gold acquired by the alchemists in their vain search has served as a basis for a more scientific study of this very interesting and useful metal.

Its Properties. First of all, it is a chemical element; that is, it cannot by any known means be separated into simpler components. It is a bright yellow, lustrous, very heavy metal (19.31 times heavier than water), and it melts at a temperature of about 1945° F. If subjected to a much higher temperature it gives off a vapor with a greenish-yellow color. It has been estimated that the boiling point would be 4585° F. Electricity and heat both pass through it readily; in other words, it is a good conductor, but needless to say it is seldom put to any of the practical everyday uses to which any of the cheaper metals are equally well suited. No other metal has ever been found which is so satisfactory for coins of high value, for jewelry and ornaments and for dentistry, and most of the gold mined is used for these purposes, for gilding or lettering, and for coloring glass and chinaware. About one-fourth of each year's production of gold, it is estimated, is used for coins.

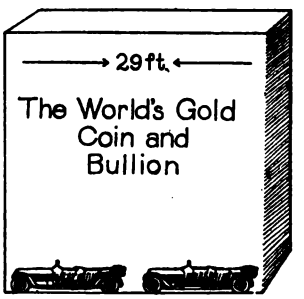
In its pure state gold has one quality which unfits it for hard usage—it is soft; and consequently it is almost always mixed with a harder metal, the mixture being known as an alloy. A finger ring of pure gold would not hold its shape well; a coin of pure gold would wear away quickly; so in making the former a mixture of silver is used, and for the latter about eight to ten per cent of copper. Copper deepens and reddens the color, while silver lightens it, and the proportion of either of these metals used in an alloy is determined in part by the color desired. The pureness of gold used for jewelry is measured in *carats*, and "twenty-four carats" is the standard of measurement, for it means absolute pureness. In nearly all countries gold coins are made nine-tenths pure. The Austrian ducat has 98.6 per cent of gold and 1.4 per cent of copper. The British sovereign, which is 91.7 per cent gold and 8.3 per cent copper, contains twenty-two carats; the American gold coin of ninety per cent gold and ten per cent copper contains 21.6 carats. Most twenty-carat gold has twenty parts of gold to four of a harder metal; eighteen-carat gold has two less; but articles made of this alloy have a right to be called "solid gold," for this simply means that they are of gold or the gold alloy all through, rather than having a plating of gold over a basis of some cheaper material.

Gold has two properties which are far more interesting than any of those mentioned above. It can be hammered out into a sheet of incredible thinness, or, to speak technically, it is the most *malleable* of the metals (see subheads *Gold-Beating* and *Gold Leaf* below); and it is extremely ductile—that is, it can be drawn out to a great length without breaking. As regards this latter quality, skilful operators have drawn gold out into such a tiny wire that it takes 680 feet of it to weigh one grain or about 900 miles to weigh a pound avoirdupois. But the gold, to be thus treated, must be pure. If one two-thousandth of its weight of lead, for instance, be added to the gold, the wire cannot be made.

Gold in Chemistry. Like every other element, gold has its chemical symbol, or "nickname," for it would be unwieldly in speaking of chemical compounds always to use the full name of every element; and since the Latin name for gold is *aurum*, its symbol is the abbreviation *Au*. In the paragraph above, mention is made of some of the alloys of gold, and the article ALLOY has more to say on the same subject. Now many of the alloys are mixtures and not chemical compounds; that is, each substance which enters into the alloy keeps its own individuality and properties. This is true of the alloys of gold with silver and copper and also of gold amalgam (the alloy with mercury). But gold does combine with certain substances to make real compounds. With aluminum it forms a brittle purple, and with zinc a brittle violet, compound. Alloys with iron, used in jewelry in France, are known as gray gold and blue gold on account of the modifications of the yellow color resulting from the formation of alloys.

Looking at gold and touching it, it would seem that so solid and heavy a substance could not be dissolved, and indeed most acids or other liquids have no more effect on it than

does water. On account of its resistance to oxidation, the alchemists called gold a *noble* metal or *the king of metals.* However, chlorine it cannot resist, and in water saturated with that gas it is dissolved as readily as is salt in hot water. A mixture of nitric and hydrochloric acid also dissolves gold readily, owing to the liberation of chlorine by the interaction of the two acids. On account of this effect on the royal metal the alchemists named this mixture of acids *aqua regia,* that is, the *royal water.* When this solution is evaporated yellow crystals of auric chloride are obtained. This gold chloride is used in "toning" (that is, modifying the color of) photographs. In the presence of air, a solution of sodium (or potassium) cyanide dissolves gold. This fact is utilized in extracting the metal from its ores.



THE GOLD OF THE WORLD

All the money of the world, except that of the few countries which have a silver, nickel or paper standard, is based on about $8,000,000,000 in gold. A cube of gold of this value would measure twenty-nine feet on each edge. The large automobiles in the illustration help to a realization of the size of such a solid.

How Gold Exists in Nature. Long, long ago, people did not delve deep in the earth for their supply of gold. They just took what nature had left ready for them on the surface. Gold was frequently found then, as it is sometimes found to-day, mixed with the sand and gravel along a river course. When so found it is in a pure state or mixed with silver, and occurs in all sizes from tiny particles like grains of glistening sand to nuggets of fair size. So far as is known, the largest nugget ever found thus free in the sand and gravel was discovered in Victoria, Australia, and weighed 183 pounds. It is hard to conceive of the intense excitement which must have prevailed when this $50,000 lump of gold was picked up.

To obtain gold from such alluvial sources, only a simple washing is necessary. These surface deposits are called *placer* mines, and most of them are shallow and quickly exhausted. Naturally they are the more conspicuous and enticing sources of gold, and in almost every case where the discovery of gold has been followed by the rush of thousands to the spot, it has been metal of this easily attainable variety that has been first sought. The "forty-niners," for example, who formed the endless caravan across the desert to California, were seeking "placer" gold, and the first findings in the Klondike region, in Australia and in South Africa were of the same variety. At first, every man washed his own gold in a simple sheet-iron *pan,* but later hydraulic machinery was introduced—powerful machinery which by means of its forcibly-driven streams of water tears out gravel and soil and boulders in the gold-bearing regions and, by a system of gratings, separates the gold from the worthless material. This is a wasteful process—wasteful not of gold, but of soil—and it has been practically forbidden in well-settled places, as in California. To take its place, in sections where placer gold exists, another method, which employs dredges, has been introduced.

All gold does not exist in this free state. Much of it exists in ores or gold-bearing rock, and must be mined like any other metal, by means of great shafts sunk into the earth. In Western Australia, Transylvania and Colorado large quantities of a compound of gold with tellurium (formula $Au\ Te_2$) are found. This is a gray or black ore, though an admixture of free gold sometimes gives it a brassy color. Gold-bearing ores are especially plentiful in mountainous regions.

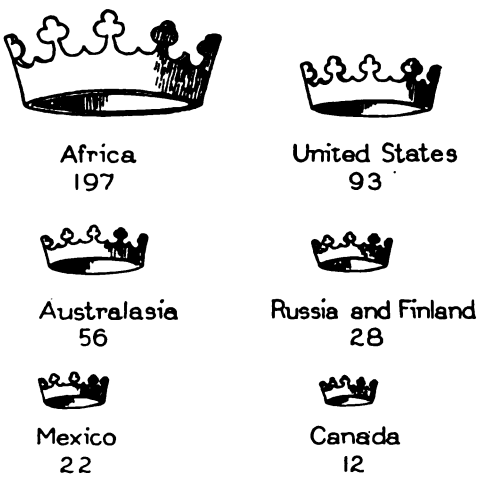
Taking Gold from the Ores. After the rock with its precious admixture of gold is brought to the surface, there remains much to be done before the gold is in an easily recognizable state.

The miner has no nuggets of pure gold to carry about in his pocket, or to tie up into a long string in the fascinating manner of a Bret Harte hero; it was placer gold entirely with which these men dealt. The treatment given gold-bearing ore depends largely on what other substances enter into its composition, but the preliminary process is usually the same. The ore is crushed and ground to a fine powder by a stamping machine, and is then passed over copper plates covered with mercury. This substance has a strong affinity for gold, and as the ore passes over it, it draws out the gold particles and lets the other material pass by. The pulpy mass of mercury and gold which results is known as *amalgam.* This is first squeezed, to force out the excess mercury, and the hard amalgam which remains is heated until the mercury distils and passes off in vapor, leaving the gold.

There are other processes of extraction in which the gold is dissolved by chlorine or by cyanides and afterwards reprecipitated from the solution, but these are more complicated than the amalgamation process described above. Frequently they are used in combination with the above, to recover the gold which the mercury has allowed to escape.

Where Gold Is Found. Gold is widely distributed over the earth, and wherever it is known or believed to be, men are certain to find their way. In the fifteenth and sixteenth centuries there was a legend which told of a wondrous region called El Dorado, "the golden," where gold was reputed to be as common as sand, and many of the exploring parties which set out from Europe during that period of romance and adventure were in quest of that marvelous country. They never found it, but in the nineteenth century several discoveries were made which caused people to exclaim at first, "El Dorado, surely;" for so rich did the possibilities seem in California, in Australasia, in Alaska, in South Africa.

At present there is approximately $460,000,000 worth of gold produced in the world annually; that is, there is probably twice as much mined each year as existed in the whole of Europe at the time America was discovered. Of this vast amount Africa produces over forty per cent; the United States, including Alaska, over twenty per cent, more than $90,000,000 worth; Australia and New Zealand, twelve per cent and Russia about six per cent. It is believed that certain countries of South America are capable of considerable development as gold-mining countries. The world's stock of gold in 1917 was estimated at $16,000,000,000, one-half of which is supposed to be in coin and bullion.



THE ANNUAL PRODUCTION

The proportionate sizes of the golden symbols are helpful in comparing the production of gold in the leading countries.

United States. Though gold has been found in the eastern slope of the Appalachian Mountains, the production in the United States is largely in the Western mountain country. California, Colorado, Alaska and Nevada are the richest gold-producing regions, though South Dakota, Arizona, and Montana and Utah have an annual yield of several million dollars each. For many years after the sensational discovery of gold in 1848, California was without a rival as a gold-producing state, but in more recent times Colorado, Nevada and Alaska have challenged its supremacy.

Canada. The Dominion produces about one-eighth as much gold as does the United States. Ontario, British Columbia and Yukon are the largest producers among the Canadian provinces. The production in 1915 was more than double that in 1907, but was not so great as that in any of the four years from 1899 to 1902, when the placer deposits of the Klondike in the Yukon district were producing so abundantly.

Africa and Australasia. The greatest goldfield in the world, so far as is known, is in the Transvaal, in South Africa; Rhodesia and the Gold Coast yield amounts which are small in comparison to the rich stores from that more-favored land.

In Australasia the placer mines have been for the most part exhausted, but the deep mines still yield splendidly. Western Australia ranks first among the states, with an annual yield of about $25,000,000, Victoria, Queensland and New Zealand each averaging not more than a third of that amount.

Gold-Beating. As stated above, gold is so malleable that it can be hammered into very thin sheets—so thin that it takes more than 367,000 to make a pile an inch high! The process by which these thin sheets are made is known as *gold-beating,* and is carried on as follows:

A very small amount of either copper or silver, according to the color desired, is mixed with the gold, which is subjected to a very great heat to render it more malleable. It is then cast into a bar, which is passed between rollers and flattened into a ribbon one-eight-

hundredth of an inch in thickness. This is cut into pieces about one inch square, which are laid between leaves of a very thin, tough paper. Exactly in the middle of each leaf the gold is placed, and the alternation of paper and gold is continued until there are 210 sheets of gold in the little pile, which is called a *cutch*. This is bound in parchment, laid on a marble block and beaten for twenty minutes with a great hammer which weighs sixteen or seventeen pounds. So much elasticity has the cutch that the hammer actually rebounds, and does not need to be lifted.

When the first beating stops, the little gold sheets are three and one-half inches square. Each one is then cut into four squares, and these are placed between leaves of gold-beater's skin, a special membrane prepared from the intestine of the ox. The beating is continued with a ten-pound hammer for about two hours; the gold sheets are again taken out and quartered; and a third beating with a seven-pound hammer reduces them after about four hours to their final state, when they are known as gold leaf.

Gold Leaf. The incredibly thin leaves, through which the light can now filter, are taken up with wooden pincers, laid on a leather cushion, and trimmed with a knife made of rattan to sheets three and one-half inches square. Twenty-five of these, between sheets of paper, make up a "book," and the books are sold in packs of twenty, the wholesale price of a pack averaging a little more than seven dollars. As the cost of the gold thus used is somewhat over four dollars, and as the long and tedious process must all be carried on by hand, it may be seen that the profit is not excessive. The ordinary gold leaf of commerce is not reduced to the very minimum thinness, but each one is about $\frac{1}{200000}$ of an inch in thickness.

Gold leaf as used in the arts is familiar to everybody. It appears in the lettering on book covers, on picture frames, on furniture, on pottery—everywhere, in fact, where gilding is used; for most gilding is done by means of gold leaf. On the Egyptian mummy cases which have lain in the tombs for thousands and thousands of years, there are numerous examples of such gilding, which show that the ancients must have understood gold-beating almost as well as do modern artisans.

Dentists, too, use large quantities of gold leaf, as that is the form in which their material for fillings comes to them. Theirs, however, is not the very thinnest variety, as the beating is not carried beyond the cutch stage, and it must be pure gold and not an alloy.

Gold lace consists of very fine strips of gold twined around silk. It contains only about two and one-half per cent of gold. Precipitated gold (purple of Cassius) is used in the manufacture of ruby glass. A.MC C.

Consult Curle's *Gold Mines of the World;* Kemp's *Ore Deposits of the United States.*

Related Subjects. Further information connected with gold may be obtained from the following articles in these volumes:

Alchemy	Ductility
Alloy	Gravity, Specific
Amalgam	Malleability
Carat	Mining
Chemistry	Money

GOLD COAST, a British colony in West Africa, with a coast line of 334 miles, extending along the Gulf of Guinea. It owes its name to the abundance of gold found in all parts of the colony. The area of the Gold Coast itself is about 25,000 square miles, but with Ashanti and the Northern Territory annexed in 1901, the area is nearly 81,000 square miles. The climate is very unhealthful, and few Europeans can withstand the deadly fevers prevalent in all parts of the colony. The soil is wonderfully fertile, and produces coffee, cocoa, tobacco, cotton and spices. The chief exports are gold, copra, palm oil, rubber and cocoa. The colony is divided into three provinces, Western, Central and Eastern, administered by resident commissioners, who are responsible to the governor of Cape Coast Colony, appointed by the British Crown. Ashanti and the Northern Territory each have separate chief commissioners. The chief towns are Coomassie, capital of Ashanti, Accra, Cape Coast Castle, Seecondee, Quittah, and Winnebah. Population in 1911, 1,503,386.

GOLDEN AGE, a term used to represent the period of highest development in literature and art in a country. The Romans used it to describe the ideal time when, under Saturn's reign, the earth produced without cultivation, and happiness, peace and sinlessness prevailed. It is broadly applied to the fanciful era, usually of extreme youth, before one's illusions are lost.

GOLDEN BULL, a term applied in a general way to any state document bearing a golden seal. The word is from the Latin *bulla aurea,* so called from the golden case in which the seal attached to the bull, or document, was inclosed. One golden bull in particular relates

the edict issued in 1356 by Charles IV of Germany for the purpose of decreasing the confusion attending imperial elections. The decree limited the number of electors to seven (three prelates and four lay princes). Frankfort was declared to be the place of election, and Aix-la-Chapelle that of coronation. The important questions of the dependence of the imperial office on the Pope, and the latter's authority to investigate and approve elections, were ignored.

GOLDEN FLEECE, in Greek mythology, a fleece of gold which was guarded by a dragon in a grove sacred to Mars, in the city of Colchis, on the shore of the Black Sea. That Jason might prove himself worthy of the throne of Iolcus, which he claimed from the usurper Pelias, his uncle, he was commissioned to bring back the Golden Fleece. He started on this perilous adventure with a band of heroes, who sailed in the ship *Argo*. Many were the thrilling experiences which the Argonauts encountered, but Jason secured the Fleece and returned to Iolcus to demand the abdication of the wicked Pelias. See ARGONAUTS; JASON.

GOLDEN GATE, THE, the picturesque channel which connects San Francisco Bay with the Pacific Ocean. Anyone who has crossed the bay, even in an unromantic ferry boat, and has looked out through the Golden Gate at

THE GOLDEN GATE

sunset has seen a picture which he is not likely to forget. The channel is in effect but a mountain pass—a mountain pass with a branch of the ocean overspreading it. On either side the mountains which border the great bay break off rather abruptly, forming bold promontories, "on which the sea breaks heavily." The passage between, which is deep enough to admit the largest seagoing steamers into the peaceful harbor, is one mile wide and four miles long. Some accounts say that Drake named the Golden Gate far back in the sixteenth century, but J. C. Fremont in his *Memoirs* claims the honor for himself. See SAN FRANCISCO.

GOLDEN HORN, a name given to a beautiful harbor, an inlet of the Bosporus, on which stands the city of Constantinople. It is six miles long, about half a mile wide at the widest part, and more resembles a river than a har-

THE GOLDEN HORN

bor. It is deep, well sheltered and capable of accommodating 1,200 large ships at anchor. On the eastern shore of the Golden Horn are the beautiful suburbs of Pera and Galata. The city of Constantinople now consists of a collection of towns and villages on both sides of the Golden Horn, Galata, magnificently situated overlooking the harbor, being the modern business center—the location of banks, post offices and steamship offices. Pera is the residential section, occupied by European business men and embassies and the most modern and fashionable hotels and shops.

There is an old expression to the effect that when one has seen Naples he may be content to die, as nothing more beautiful remains to be seen. The fascination of the Golden Horn is equally great, and its beauties, once seen, can never be forgotten. For illustration of the great city, see CONSTANTINOPLE. F.ST.A.

GOLDENROD, the most familiar and abundant of North American late summer and early autumn wild flowers. It is such a general favorite that it has been chosen the national flower of the United States, and the state flower of Alabama, Iowa, Kentucky, Missouri, North Dakota and Nebraska. It has a slender, wandlike stem, smooth or hairy, which bears thick clusters or graceful plumes of compound, bright yellow, deep golden or white flowers. The leaves, smooth or hairy, even or toothedged, may be seen swaying by dry roadsides,

in moist woods, in swamps and peat bogs or in cultivated gardens. There are about a hundred species, some of the commonest being the *early goldenrod,* often dried for interior

Because its myriad glimmering plumes
Like a great army's stir and wave;
Because its golden billow blooms,
The poor man's barren walks to lave:
Because its sun-shaped blossoms show
How souls receive the light of God,
And unto earth give back that glow—
I thank Him for the Goldenrod.
—LUCY LARCOM: *Goldenrod.*

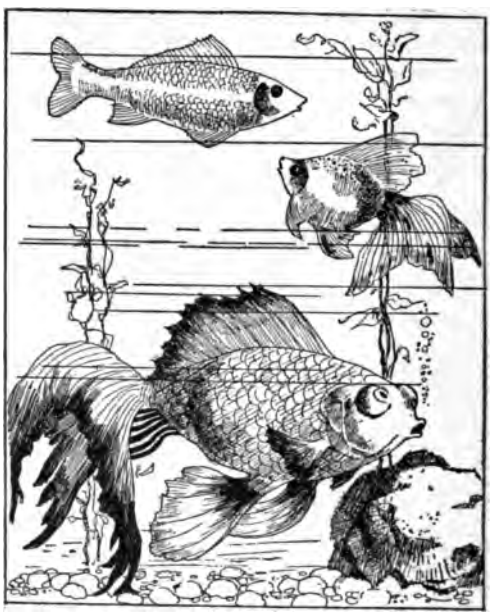
decoration; the large, handsome *Canada goldenrod;* the showy *seaside goldenrod,* and the *lance-leaved* or *fragrant goldenrod.*

Various species of this flower are valued as forage. The Canada goldenrod yields a strong fiber, but it is not used commercially. The leaves of another species, the *sweet goldenrod* or *Blue Mountain tea,* have been used as tea and yield an oil employed in medicine as a tonic. A few species are found in Great Britain and Europe.

GOLD'FINCH, a joyous little songster of Eastern North America, about the size of the canary and, like that sweet singer, cheerily clothed in bright yellow. The goldfinch rejoices also in black wings and a black crown and tail, the latter varied with markings of white and gray. Its gay and ringing notes—*per-chic-o-ree, per-chic-o-ree*—are uttered with a joyous abandon that the cage bird can never equal. These merry songsters nest from Southern Manitoba, Central Quebec and Newfoundland south to Eastern Colorado, Southern Oklahoma, Central Arkansas and Northern Georgia, wintering over most of their breeding range and as far south as the Gulf of Mexico. The nest, made of grass, bark and moss and lined with thistledown, is placed in a tree or bush. Three to six pale, bluish eggs are laid in June or July. The birds love to seek their food, the seed-bearing plants, in the field and garden, where "the old sunflowers rattle before their vigorous attack and the thistles spring into sudden blossom of black and gold as they swing from the nodding heads." The goldfinch's span of life is about fifteen years.

The *European goldfinch,* which resembles its American cousin in habits, is cinnamon-brown on the back, and has a black crown, black wings marked with yellow, a black tail and white underparts. About the base of the bill is an area of bright red. It ranges throughout Europe except in the regions farthest north, and a few specimens have been seen in New Jersey, New York and Massachusetts. Its eggs, four or five in number, are white, marked with purple. This bird is a favorite cage songster in European homes.

GOLDFISH, a species of carp, kept in aquariums for their beauty in nearly all civilized parts of the world. Thousands of years ago all of this species were of greenish color, but one day, in China, several of rather golden



THREE FORMS OF GOLDFISH

hue were noticed in a pond. So through careful breeding of these, and through selection, a new race of fish was started, and in China the rearing of goldfish has become a science. From

those greenish ancestors have sprung the darting creatures of aquariums everywhere, gleaming pure gold in the sunshine.

Goldfish can be purchased for from ten to twenty-five cents each, depending chiefly on the size. They grow to about five or six inches in length, and have been known to live ten years in an aquarium. They may live a hundred years under perfect natural conditions. They should be placed in water, not too cold, in which some water-plant is growing and to which a little fresh water is added each day, and should be given a little sunshine, and fed the prepared food sold for the purpose.

GOLD LACE, a handsome fabric woven of gilded silk thread, used for decorating uniforms, liveries, altar cloths and ecclesiastical robes, banners and theatrical dress, as well as for ornamentation in women's apparel. To make the thread, a rod of silver is covered with gold leaf and drawn between perforated diamonds or rubies to make it into a fine wire. The finest of such wire is so delicate that a mile and a quarter of it weighs only an ounce. It is then wound around with silk thread, and the resulting thread of golden luster is woven into lace. *Silver lace* is similarly made.

GOLDSMITH, Oliver (1728-1774), an English story-writer, essayist, dramatist and poet, the author of one of the earliest English novels, *The Vicar of Wakefield,* and one of the best comedies of the eighteenth century, *She Stoops to Conquer.* The latter still holds the favor of the public because of its uproarious fun. As a poet he is remembered chiefly for *The Deserted Village,* a poem which touchingly describes the decay of the little town where he spent his boyhood. Its opening lines are:

Sweet Auburn! loveliest village of the plain,
Where health and plenty cheered the laboring swain,
Where smiling spring its earliest visit paid
And parting summer's lingering blooms delayed.
Dear lovely bowers of innocence and ease,
Seats of my youth, when every spot could please,
How often have I loitered o'er thy green,
Where humble happiness endeared each scene.

The Deserted Village and *The Vicar of Wakefield* both show a departure from the artificial standards of the eighteenth century; in its sincerity and sympathy for nature and humanity, the former belongs rather to the new school of the nineteenth century (see Romanticism). *The Vicar of Wakefield,* a delightful narrative of village life, is aimless in plot and weakened by absurdities, but it is justly admired for its simple and charming style, engaging humor and excellent character drawing. Dr. Primrose, the vicar of Wakefield, is one of the enduring creations in English fiction.

OLIVER GOLDSMITH
Much of his work is included among the literary treasures of English-speaking people. He wrote with grace and sweetness, and tender, pathetic charm.

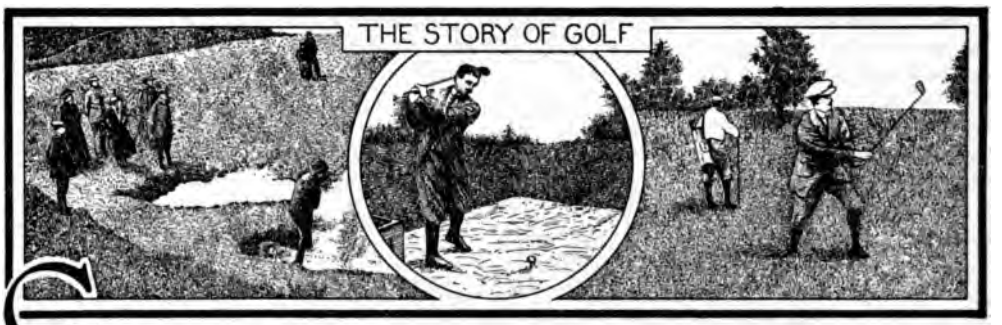
Goldsmith was born in Ireland, the son of a poor curate who is pictured in the country parson of *The Deserted Village.* He was a lazy and indifferent student, and his teachers called him a dullard. In 1744 he entered Trinity College, Dublin, obtained a degree five years later, and after his graduation made a trial of several professions, including the ministry, teaching and medicine. In none of these did he meet with success. The years between 1753 and 1756 he spent in wandering about Europe, where he sometimes earned his bread and lodging by playing the flute for dancing peasants.

Finally he took up literature, the one calling for which he was suited. Beginning as a hack-writer for London booksellers, he soon won the notice of the great Samuel Johnson (which see), who was charmed by the delightful style of his letters, published in 1760 and the year following under the title, *A Citizen of the World.* It was not long before Goldsmith found himself a member of the famous Literary Club to which belonged the greatest writers and artists of the period. In 1764 he established his fame with the publication of *The Traveller,* a poem equal in merit to *The Deserted Village,* though it has never become so popular. His literary work continued until his premature death, in his forty-seventh year. Among his writings not mentioned above are several school histories, more attractively written than accurate, and a comedy, *The Good-Natured Man.*

Goldsmith's conversation had little of the charm of his writings, and his friends took great delight in an "epitaph" which said,

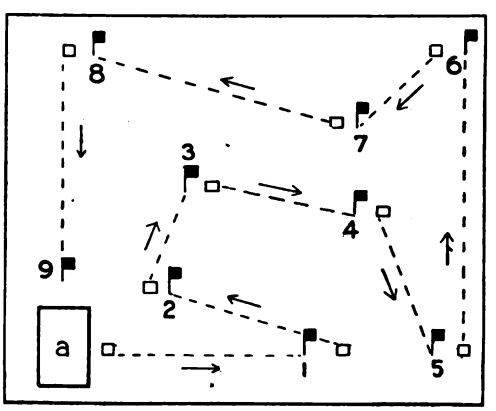
Here lies Nolly Goldsmith, for shortness called Noll,
Who wrote like an angel and talked like poor Poll.

Consult Dobson's *Great Writers;* Kelly's *Early Haunts of Oliver Goldsmith.*



GOLF, a popular game for both sexes, played in large spaces in the great out-of-doors, under conditions which promote bodily health, develop physical control and increase mental alertness. There are comparatively few playing grounds, or *courses,* because even a "short course" requires at least sixty to seventy acres of ground, while a "long course" needs 150 acres or more, to give players the fullest measure of enjoyment and opportunity to develop masterful playing. This fact renders it practically impossible to popularize the game except in thickly-populated centers, where a hundred or more people may combine to lease or purchase the needed ground and prepare it for use.

The Course. The playing field does not require stated dimensions or regular shape. A so-called "short course" demands sufficient space to locate nine "holes" from 100 yards to 500 yards apart. The direct distance between



A NINE-HOLE COURSE
(*a*) Club house, close to which is the starting point, or first "tee."

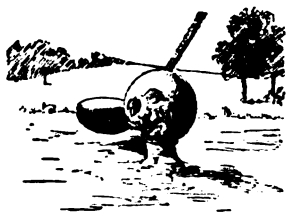
the holes must be on lines that are not crossed or closely approached by each other. This latter is a requirement for the safety of the players; those on any part of the course must feel secure from flying shots from the clubs of other players. It is always desired that the distances between holes shall vary as much as possible; more skill is then demanded in judging shots. Whether the course be one of nine holes—a *short course*—or of eighteen holes—a *long course*—the arrangement should be such that the last hole is near the starting point. In the first half of the game the participants are "playing out," or moving away from the starting point; in the second half they are "playing in," or approaching the point from which they began to play.

The field may be entirely level, a condition favored by beginners, or it may be quite hilly and wooded in places. The hazards of the game increase with the difficulties the surface of the course presents. On flat courses artificial mounds of earth, called *bunkers,* are reared to develop greater playing skill; these are also given the general term *hazards.* In front of a hazard a long, narrow pit may be dug to a depth of over a foot and its bottom covered with several inches of shifting sand. This adds greatly to the difficulties of the unfortunate player whose ball falls into the pit, for several shots may be wasted before the ball is again on the fairway.

Each hole is really a metal cup four inches in diameter and of equal depth, sunk into the ground until its top is level with the surface. The ball must be knocked into the cup, a feat requiring considerable skill. To facilitate this play the turf on all sides of the cup for about thirty feet is made very smooth. It is usually heavily grassed, and the grass is kept closely cut; sometimes, however, it is a hard clay surface. This square is called the *green,* and the play on the ball towards the cup from any point on the green is called *putting* (the *u* is given the short sound).

The Game. One person may play alone—a "single;" two may play a match game—a "twosome;" three—a "threesome;" or four—a "foursome." Only once in playing each hole

may the ball be placed definitely in position for a stroke, and that is for the first stroke off each starting place, or *tee*. In these instances a small mound of sand about an inch high may serve as a base upon which to rest the ball. The ball is then struck by a club called the *driver;* it is sent as nearly as possible in the direction of the first hole, and at the spot where it drops, another club, the *midiron, cleek, brassie, niblick* or other of special shape, is called into service to advance it once more towards the cup. These clubs are classified below. Each attempt to hit the ball, whether successful or not, counts as one *stroke;* the person who puts his ball into the cup with the fewest strokes wins the hole, and the one with the lowest score for the total number of holes wins the game; this method of scoring is called "medal" play. Sometimes, by agreement, a game may be decided upon *holes won* rather than upon the number of strokes; this is "match play."



"Now for an awful bump!"

When each of a group of players has "holed out" of the first cup, all move a few feet to the second tee, or second starting place, and proceed to drive in the same manner as from the first tee. Thus the game continues through the nine or the eighteen holes.

A ball shot into shrubbery or behind trees, from which position it cannot be struck, may be picked up and thrown into the fairway, with a penalty of one stroke; if it lands in a sand pit or in any other position where the use of a club is possible it must not be touched by the hand. If a ball is lost another may be put into play, with a penalty of one stroke; when this is done the new ball is placed on the fairway in the supposed location of the one that was lost.

Implements of the Game. The all-necessary implement is the ball. It is nearly two inches in diameter, with surface roughened to resist slipping on impact with the club. The covering is gutta-percha, the interior a semi-elastic composition. In some balls the core is hollowed and contains a fluid; this adds to their resiliency.

The golf enthusiast is tempted to fill his golf bag—cylindrical in form, about six inches in diameter and three feet long—with eight or ten clubs, each of which has its peculiar uses, but not all of which are essential. Every player should have four clubs, but a few, lacking desire to excel, use but two, a midiron and a putter. The clubs average forty inches in length, varying somewhat to meet the needs of players; those considered most necessary are the following:

"He'll never find me!"

Driver. This is one of two clubs having a wooden head, the other being the *brassie.* The player who follows the best traditions of the game invariably uses the driver on the ball at the tee.

Midiron. The midiron is so called because it is the club most used in drives in midfield, when the green to be approached is from 100 to 150 yards ahead. The iron head is bent to a slight angle, to elevate the ball only enough to assure good distance in the drive.

Mashie, or Lofter. Frequently a bunker, sand pit, tree or other hazard lies across the path, and the shot must go above it. A club with an iron head bent more obliquely than the midiron is then required; the mashie raises the ball into the air; the player sacrifices distance to secure height.

Putter. This club has a shorter handle than any other, and is used only after the ball has been shot upon the green. The short handle requires the player to lean towards the ground, from which position he can the better judge the direction and strength of stroke required to sink the ball into the cup.

Other clubs are found desirable by almost all classes of players. The two first named below are particularly recommended:

Brassie. This club is of wood and differs from the driver in that its driving surface is slightly more oblique, to loft the ball, and its base is brass-covered, that it may slip over the turf without friction. It is used in the fairway when considerable distance is desired.

Niblick. A spoon-shaped club with broad flat side to receive the impact is a useful tool with which to loft the ball sharply out of a pit or over a close and high obstruction. The pitch of the spoon is more oblique than that of any other club.

Professional players and very ambitious amateurs use all of the above clubs and sometimes others, of doubtful value to the average player. The *cleek,* with an iron head set perpendicularly, assures great forward distance, with little rise above the ground. Few players succeed with it, as their shots are likely to fly low and be stopped by the grass.

To Develop Good "Form." An article of this nature cannot give playing rules or directions the "golfer" should follow. How to stand beside the ball, how to handle the clubs, how to effect a stroke—all these require technical descriptions which the novice sometimes finds difficult to interpret. The best way to secure improvement is to study carefully the methods of the best players, unless one is able to hire a professional for a number of lessons.

"I'm a sinker!"

Golf when entered upon in the proper spirit compels courtesy, patience, control of the emotions and prompt acknowledgment of the rights of others.

Brief History. It is believed that a game similar to modern golf originated with the Dutch, but credit belongs to Scotland for developing it to its present standards and handing down its traditions. Formerly it was solely a "gentleman's game," reserved to few men, whose wealth made great courses possible. These men observed to the highest degree the ethical and social requirements so dear to the Scotch golfer, and with such a standard the game reached America in 1888. For many years only men of leisure played; the participation of women did not follow for a dozen years. Gradually in city parks golf courses were laid out, and the response of the general public was instantaneous. By 1910 many women were playing, their number constantly increasing until on some city courses the sexes are nearly equally represented. Chicago is reputed to hold a greater proportion of players to the total number of inhabitants than any other city in America; there the public courses are so crowded that on rest days people are in line at two o'clock in the morning to secure early playing privileges. There are in that city seven public courses, and within twenty miles of the business center over thirty private courses are maintained. New York City provides three public courses, but within a short distance from the center of business there are over a hundred private clubs. E.D.F.

Consult Clark's *Golf: A Royal and Ancient Game;* Hutchinson's *The New Book of Golf;* Travers's *The Travers Golf Book.*

GOLI'ATH, the giant from Gath, famous only for the fact that he was killed by the youth David (which see). The Philistines had come up to make war against Saul, and as the rival camps lay opposite each other this giant came out each day to challenge one of his enemy in single combat. Finally David, armed simply with a sling and pebbles, went out and quickly slew him. Then all the Philistines, upon seeing their champion killed, were disheartened and easily put to flight. See GIANTS.

GOMEZ Y BAEZ, *go maze' e bah'aze,* MAXIMO (1826-1905), a general of Cuban insurgents, was born at Bani, Santo Domingo. In the revolt of the island against Spain in 1844, he served as a lieutenant of cavalry in the Spanish army, which he accompanied to Cuba but afterwards left on account of General Villar's abuse of some Cuban refugees. In 1868 he joined the Cuban rebellion, and became a major-general. He was instrumental in bringing about the insurrection of 1895, and was made commander-in-chief of the Cuban army. In the Spanish-American War in 1898, when the Americans landed in Cuba, he gladly coöperated with them, placed his force of soldiers at their command and remained on terms of friendship with them throughout the campaign. In the same year he was deprived of his command by the Cuban Assembly, who believed that his acceptance of $3,000,000 for his army from the United States constituted an act of disloyalty. Gomez was at one time mentioned as a candidate for the presidency of the Cuban republic.

GOMPERS, *gom'perz,* SAMUEL (1850-), an American labor leader whose efforts in behalf of organized labor have brought him into national prominence. He was one of the organizers of the American Federation of Labor, and, with the exception of the year 1894, has served continuously as its president since 1882. He was also elected first vice-president of the National Civic Federation. Gompers was born in London, but emigrated to America when he was thirteen years old; a year later he began his association with organized labor by becoming the first registered member of the Cigar-Makers' International

SAMUEL GOMPERS

Union. This organization became through his efforts one of the most successful trade unions.

His aim has been to work along constructive lines and to promote industrial arbitration, and he has used his influence to secure legislation favorable to the working classes. With other officers of the American Federation he was sentenced to a term in prison in 1908 for refusing to take the name of the Buck Stove & Range Company from the boycott list in the official organ of the union, but after several appeals the case was dismissed in 1914 by the United States Supreme Court. It is worthy of note that he was almost the only labor leader of national influence in 1916 who advocated military preparedness for his country, a movement which was generally opposed by organized labor. Gompers is the author of several pamphlets on the labor question, and of *Labor in Europe and America.* See LABOR ORGANIZATIONS.

GON'DOLA, a curiously shaped and often highly ornamented, silently moving boat or barge-cab of Venice, the water-city—that favorite subject of painters. The typical gondola is a flat-bottomed boat about thirty feet long

ON THE CANALS OF VENICE

by four feet wide, each end curved perpendicularly upward to about the height of a man, and ending in a sharp point. Toward the middle there is a gaily curtained chamber for passengers. Usually there is but one boatman, called a *gondolier,* who faces the bow and propels the boat quickly and deftly with a forward stroke of an oar. In accordance with an ancient law passed to prevent extravagance and competition in the decoration of gondolas, all are painted black except those of high officials. In his *Beppo,* Byron paints a word picture of the gondola.

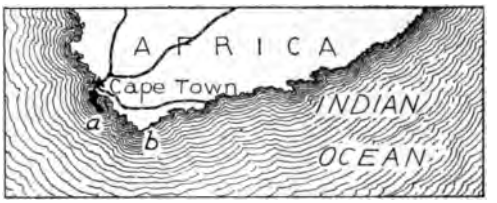
This picturesque means of conveyance is now being replaced to a great extent in Venice by noisy little gasoline launches. The origin of the name *gondola* is disputed. See VENICE.

GONSALVO DE CORDOVA, *gohn sahl'vo day kohr'do va,* GONZALO HERNANDEZ Y AGUILAR (?1453-1515), a Spanish general called the *Great Captain,* was born at Montilla. He rendered distinguished service in the war of Queen Isabella against Portugal and in the conflict which drove the Moors out of Europe, and was instrumental in bringing about the union of Granada and Castile in 1492. In 1495 he united with Ferdinand, King of Naples, against the French, and in a few months succeeded in vanquishing them. In 1500, when Ferdinand of Aragon and Louis XII of France decided on the conquest of Naples, Gonsalvo led the invading Spaniards and took possession of the kingdom. The conquerors soon quarreled over the division of the booty, and war was declared between them in 1502. Gonsalvo vanquished the French at Cerignola in 1503 and took several important cities, including Naples. He sustained the single defeat of his life at Gaeta, but ultimately drove the French from Naples. Ferdinand then appointed him viceroy of Naples, with absolute authority. He was soon recalled to Spain by the king, who resented his general's growing popularity, and his last years were spent in retirement.

GOO'BER, a popular name applied to the peanut (which see).

GOOD FRIDAY, the anniversary established by religious bodies as a memorial of the Crucifixion of Christ. It is solemnized on the Friday before Easter by churches of many denominations and by various schools and public institutions. Its commemoration is of ancient origin, dating to the time of Constantine, who prohibited all public activities on this day. It is still a legal holiday in Great Britain and Ireland and the British colonies. In the Roman Catholic Church the mass is somewhat different from that read on other days, the Host having been consecrated on the previous day. In the Anglican and Roman Catholic Churches the Three Hours' Devotion service is held between twelve and three o'clock, in commemoration of the agony of Christ upon the cross during those hours. In accordance with the calculations of the Royal Astronomical Society of Berlin, a German scientist has fixed the exact date of the Crucifixion as April 6, A. D. 33.

GOOD HOPE, a cape near the southern extremity of Africa, at the termination of a small peninsula extending south from Table Mountain, which overlooks Cape Town. The cape, locally known as Cape Point, or "the Point,"



CAPE OF GOOD HOPE
(*a*) Cape of Good Hope. The most southerly point of the continent is (*b*) Cape Agulhas.

forms the west side of False Bay, and on its inner or eastern coast is Simon's Bay and Simon's Town, where there is a safe anchorage and a British naval station. Bartholomeu Dias, a Portuguese, who discovered the cape in 1487, called it *Cape of Storms,* but John II of Portugal changed this to its present name, as its discovery aroused a hope of finding a sea route to India. This hope was verified by Vasco da Gama in 1497 when he sailed around the Cape of Good Hope and found his way to Calicut, on the west coast of India.

The Cape of Good Hope is not the most southerly point of Africa. That distinction belongs to Cape Agulhas, about 100 miles to the southeast.

GOOD ROADS MOVEMENT, the name identified with the attempt to secure better roads throughout the United States and Canada. For details, see ROADS AND STREETS, subtitle *The Good Roads Movement.*

GOOD TEM'PLARS, INTERNATIONAL ORDER OF, a fraternal society organized at Fayetteville, N. Y., in 1851, having for its object individual total abstinence and world-wide prohibition of the liquor traffic. The Order was introduced into England in 1868 and soon spread throughout the civilized world, its code being translated into eighteen different languages. The question of the admission of colored persons caused a division in 1874; a section of the society then organized under the name of the *Right Worthy Grand Lodge of the World.* In 1887 the two branches were reunited.

The national prohibition party was formed in 1869 by a committee appointed by the Right Worthy Grand Lodge, and thus the Order was primarily responsible for putting the temperance question into politics; and the Woman's Christian Temperance Union was organized in 1874 by Good Templar women. The Washingtonian Home for Inebriates at Chicago, Ill., and the Orphans' Home at Vallejo, Calif., were founded by this Order. In 1916 the organization comprised two national grand lodges (United States and Canada) and seventy grand lodges, with a total membership of 680,665, including 263,410 in the juvenile branch, distributed over a larger part of the world. Members are required to pledge themselves to the temperance cause.

GOOD WILL, the advantage acquired by a business concern beyond the valuation of its capital, property, stock or funds employed in it. It arises in consequence of business location, the reputation established by honest and fair dealing, and on the assumption that old customers will continue to buy at their accustomed place. Legally, good will may not be assigned or mortgaged, but when a business is sold, the seller is not supposed to enter into the same business again near enough to affect the pecuniary interests of the purchaser. In most states and provinces a written contract to this effect is secured, and if the agreement is broken the former owner of the property is liable to an action for damages.

GOODWIN, NATHANIEL CARL (1857-), an American actor who attained a large measure of success in comedy rôles. He was born in Boston, and made his first appearance in a play entitled *Law in New York.* His second success, *Black-Eyed Susan,* established his reputation as a comedian of the "legitimate" type. Among the other plays in which he assumed leading parts are *A Gold Mine, A Gilded Fool, Nathan Hale, When We Were Twenty-One* and *The Genius.* He was married four times, his second wife being Maxine Elliott, a popular actress; his last union was with Miss Edna Goodrich, also an actress. His first wife died; the others divorced him. He has appeared in vaudeville, telling stories and imitating some of his actor friends; he has also played in leading rôles before the moving-picture camera.

GOOD'YEAR, CHARLES (1800-1860), an American whose work made possible the wonderful development of the rubber industry. Imagine a rubber coat which in winter was so stiff that it would stand unaided, but on a hot summer's day became soft and sticky and if stretched would remain out of shape! Daniel Webster, who was Goodyear's lawyer in his patent suits, had such a coat, and if Goodyear had not spent all his spare time and

money for years in trying to make good rubber, our coats and overshoes to-day might be like it, and automobile tires such as we now have would be unknown.

The discovery which this tireless inventor made was that rubber mixed with sulphur and heated to the melting point is no longer subject to changes of weather. He learned this fact in 1839, after nine years or more of persistent effort in the face of poverty. It was another five years before his process was perfected and could be patented, and then came year after year of lawsuits to protect the patents—suits so expensive that he was never out of debt.

Goodyear was born in New Haven, Conn., though his boyhood was spent in Naugatuck. He became an iron manufacturer in Philadelphia, entering into a partnership with his father, which in 1830 ended in failure. He then turned his attention to rubber, with the result described above.

GOOSE, a web-footed bird closely allied to the swan and duck, and in size ranging between the two. Its neck is longer than that of the duck, but shorter and less gracefully curved than that of the swan. Geese are more at

THE GOOSE

home on land than either swans or ducks, as their legs are longer and placed nearer the middle of the body. Geese are long-lived; in some cases individuals have reached the age of fifty years. There are about forty species found in different parts of the world. In the United States and Canada there are ten or twelve species of wild goose. These are migratory, and early in the spring they fly in wedge-shaped flocks to the northern breeding grounds as far north as the shores of Hudson Bay. Their winter haunts are the Southern United States and Cuba. When on the wing they utter curious *honking* cries. Most geese are vegetable feeders, searching for food on land, frequenting the water less than ducks but often enjoying plants growing in shallow lakes. The Canada goose (which see) is the most numerous of the American species; occasionally when migrating it is seen in flocks of thousands, honking loudly enough to be heard at a distance of several miles.

Domestic geese are descended from the graylag goose of Europe, but by careful breeding have been developed to much greater size and weight. The graylag goose is now scarce, but is found in some parts of Northern Europe. Geese were imported by the early colonists of America. The American wild goose, or "honker," has since been tamed and introduced into Europe. The raising of geese was formerly much more extensively carried on than now; flocks of several thousand guarded by peasants, called gooseherds, were common in England and Europe until recent years. They are highly valued for their flesh and for their feathers, quills and eggs. The flesh is usually roasted. From the livers of fattened geese the delicately-flavored paste known as *pâté de foie gras* is made. The food value of goose is high, the percentage of fat and protein being more than that of beef. This prized game bird is protected from slaughter, except for brief seasons, in nearly all the states and Canadian provinces.

In History and Literature. The story of the sacred geese that saved the city of Rome is one of the most interesting narratives of early Roman history. In 390 B. C. the Romans were attacked by a fierce northern race of people called Gauls. Finally driven to their last place of refuge, a steep, rocky hill known as the Capitol, they prepared to withstand a long siege. One night as the Consul Manlius lay sleeping beside his sword, near the Temple of Juno, where were kept the sacred geese, he was awakened by a clamorous outburst of hissing and cackling. Grasping his sword, Manlius rushed to the walls of the

WEDGE-SHAPED FORMATION
The appearance of geese on the wing when migrating.

fortress and discovered that the enemy had climbed the steep rock and were about to storm the place. Then the other Romans, awakened by the clamor of the frightened birds, hurried from their sleeping places to the spot where the brave consul was defending the walls, and in the battle which followed completely routed the Gauls.

The Christmas goose is often mentioned in English stories; lovers of Dickens' *Christmas Carol* will recall its prominence in that favorite among Christmas tales. One of the old, familiar fables is the story of a goose that laid each day a golden egg. How its greedy master killed it and cut it open, hoping to find in its body untold wealth and found nothing, is often told to impress the lesson that greediness never wins us anything. E.T.S.

Consult Elliott's *Wild Fowl of the United States and British Possessions;* Shaw's *Wild Fowl.* Relating to domestic varieties, consult *Farmers' Bulletin 64,* United States Department of Agriculture, "Ducks and Geese."

GOOSEBERRY, *goos'ber i,* an extensively-cultivated oval berry, popular for jelly, jam, marmalade and pies. It belongs to the same genus as the currant and requires practically the same conditions and care. In color it may be white, yellow, green or red, and may be prickly, hairy or smooth.

GOOSEBERRIES

The shrub which bears gooseberries is strong - growing and upright, with very spiny branches, deeply-lobed leaves and greenish - yellow flowers. It is native to Europe and Asia and has been highly cultivated and prized in England. Early pioneers carried varieties of European gooseberries to America, but they soon perished from disease, and the climate did not seem suited to them. In the middle of the nineteenth century, however, the pale red Houghton seedling was produced from a wild North American variety of gooseberry, and that was followed by the large, handsome, pale green Downing. Both species resist mildew and are now widely cultivated. In the United States gooseberries of many varieties are grown in the North-Central, Middle Atlantic and Mountain divisions, Illinois and Missouri being the leading states in production; these two furnish about $85,000 worth yearly. Gooseberries are also grown in Canada; it is estimated that in Ontario the yield brings from $100 to $500 an acre.

The origin of the name gooseberry is disputed, some authorities attributing it to the rough, bristly surface of the wild berries, a quality of goose flesh or goose skin, others saying it is a modification of the word *gorse,* meaning *prickly.*

There are a number of ornamental species of gooseberry, remarkable for their beautiful white flowers, or handsome leaves and fruits.

GOOSEFOOT, or **CHENOPODIUM,** *ke no po' di um,* a genus of plants so called from the shape of the leaves. There are about fifty species, most of them useful natives of Europe and temperate regions in Asia, a few found as troublesome weeds in America. One species, however, known as *wormseed,* is valued in America for oil extracted from the seed and used as a remedy for worms. Another species, known as *quinoa,* furnishes an important article of food in South America.

These plants, with leaves plain or tooth-edged, and small greenish flowers in clusters, are found native in waste places and by roadsides in Europe and Asia. There, the leaves of some are used as a substitute for spinach. Young shoots of others are used as asparagus.

GOPHER, *go'fur,* a name given by the early French settlers of North America to various little digging, gnawing animals whose burrows honeycombed the soil. The true gopher, found in Western North America, is a reddish-brown, molelike animal about ten inches long. It is remarkable for having fur-lined pouches on the sides of its face and neck, extending in some species from mouth to shoulders. These pouches are used for carrying dirt from their burrows and to carry their food of grass, roots, nuts, buds and farm vegetables. The front feet of gophers are well fitted for digging, for they have large claws. Gophers are seldom seen, for they go about at night, but little mounds of earth here and there show their presence in the earth.

A species of gopher found in Gulf states is called *salamander.* The common *striped gopher,* or *prairie squirrel,* of the Western plains is quite a different animal, more closely allied to chipmunks. It does considerable damage

through its burrowing habit. Flooding the burrows or forcing sulphur fumes into them will kill the pests. Animals similar to gophers

THE GOPHER

are found in the plains of India, Russia, Tartary and South Africa.

GORDIAN KNOT, *gawr'di an not,* in ancient mythology, the skilfully-tied knot with which the Phrygian peasant, Gordius, fastened his yoke and cart. According to the legend, this peasant, through the intervention of the gods, was made king of Phrygia. Gordius then dedicated his cart and yoke to Zeus, and oracles foretold that whoever should unloose the complicated knot would be ruler of all Asia. After many unsuccessful attempts of others, Alexander the Great came to Gordium, a city in Phrygia named for Gordius, and cut the knot with his sword, asserting that by so doing he had fulfilled the prophecy. From that originated the expression *cutting the Gordian knot,* meaning to solve a difficult problem with unexpected cleverness.

Gordius was the father of the famous Midas (which see), whose touch turned everything to gold.

GOR'DON, CHARLES GEORGE (1833-1885), an English soldier, called CHINESE GORDON and GORDON PASHA because of illustrious service in China and Egypt, was born at Woolwich. He was educated at Taunton, entered the Royal Military Academy at Woolwich in 1848, obtained a lieutenant's commission upon graduation in 1852, and almost immediately saw active service in the Crimean War. He took part in the expedition to China in 1860, assisted in the capture of Peking and commanded the Chinese force which suppressed the Taiping rebels. In 1873 he was appointed governor of the Sudan, resigning his post in 1880 after his failure to arrange a treaty between Egypt and Abyssinia. In 1884 he was again sent by his government to the Sudan to assist the Khedive in withdrawing the garrisons of the country. He made a gallant defense of Khartum, and was killed two days before the arrival of the relief party under Lord Wolseley. Gordon was a man of deep religious convictions. His diaries and letters have been published.

CHARLES GEORGE GORDON

GORDON, CHARLES WILLIAM (1860-), a novelist and Presbyterian clergyman whose dramatic and realistic stories of life in the Canadian Northwest have brought him into the front rank of Canada's writers. To the thousands who have learned to love his stories he is best known by his pen name of RALPH CONNOR, "a name that covers one of the most honest and genial of the strong characters that are fighting the devil and doing good work for men all over the world." A spiritual touch animates all of his writings, and one feels after reading any of his stories that the author wrote from a sense of deep moral earnestness. The underlying purpose of his work as a novelist is best expressed in his own words, from the preface of *Black Rock,* an early success:

"RALPH CONNOR"

> The men of the book are still there in the mines and lumber camps of the mountains, fighting out that eternal fight for manhood, strong, clean, God-conquered. And, when the west winds blow, to the open ear the sounds of battle come, telling the fortunes of the fight. Because a man's life is all he has, and because the only hope of the brave young West lies in its men, this story is told. It may be that the tragic pity of a broken life may move some to pray, and that the divine power there is in a single brave heart to summon forth hope and courage may move some to fight. If so, this tale is not told in vain.

Charles W. Gordon was the son of a Scotch Presbyterian minister who came to Canada in the early "forties" and settled in a forest section of the County of Glengarry, Ontario. There the author was born. On completing a high school course at Saint Mary's, Ontario, he en-

tered the University of Toronto, and after his graduation studied theology for three years at Knox College, Toronto. In 1890 he was ordained to the Presbyterian ministry, and the same year began a three years' sojourn as a missionary among the miners and lumbermen of the Canadian Northwest Territories. In 1894 he was appointed pastor of Saint Stephen's Presbyterian Church, Winnipeg.

Many honors have come to him, including election to the vice-presidency of the Canadian Society of Authors, and to a fellowship in the Royal Society of Canada.

His deep sympathy with the people among whom he has worked, his understanding of their problems, and his penetration into human nature are revealed strikingly in such stories as *Black Rock, The Sky Pilot, The Man from Glengarry, Glengarry School Days, The Prospector* and *The Doctor.* His latest novels are *Corporal Cameron of the Northwest Mounted Police,* and its sequel, *The Patrol of the Sun Dance Trail.* Other works include *The Angel and the Star* (sermons), *The Life of the Late Rev. Dr. James Robertson* and *The Dawn by Galilee.* B.M.W.

GORDON, DANIEL MINER (1845-), a Canadian Presbyterian clergyman and educator, chosen in 1903 to succeed the Rev. George Monro Grant as principal of Queen's University. Dr. Gordon was born in Pictou, N. S., received his preliminary schooling at the local academy, and later attended the universities of Glasgow and Berlin. He was ordained to the Presbyterian ministry in 1866, and from that year until 1894 was successively pastor at Truro, N. S., Winnipeg and Halifax. While in Winnipeg he was honorary chaplain of the 90th Regiment, and saw active service with the fighting column under General Middleton during the Saskatchewan Rebellion in 1885.

Gordon was then, until his election to the principalship of Queen's University, professor of systematic theology in the Presbyterian College, Halifax. Under him Queen's has largely increased its material equipment and the number of students and professors. Dr. Gordon was conspicuous in promoting the union of the Presbyterian Churches in Canada, and has also labored for the union of the Presbyterian, Methodist and Congregational Churches of Canada. He was a delegate to the World's Missionary Convention at Edinburgh in 1910, and is vice-president of the Lord's Day Alliance. G.H.L.

GORDON, JOHN BROWN (1832-1904), an American soldier, statesman, lecturer on war subjects and author of *Reminiscences of the Civil War,* was born in Upson County, Ga. After his graduation from the state university in 1852, he took up the practice of law. With the outbreak of the War of Secession he organized the "Raccoon Roughs," a band of men from Raccoon Mountain, Alabama, where he had mining interests, and entered the Confederate army as captain of infantry, later being promoted to lieutenant-general. He commanded one wing of Lee's army at the famous surrender of Appomattox Court House. Gordon was elected to the United States Senate in 1873, 1879 and 1891. From 1888 to 1890 he was governor of Virginia and for many years was commander-in-chief of the United Confederate Veterans' Association. The latter part of his life was spent in lecturing.

GOR'GAS, WILLIAM CRAWFORD (1854-), the only man in the United States army who fights all the time. He does not contend against hostile regiments, but he battles with the disease-breeding insect enemies of man. Dr. Gorgas is surgeon-general in the United States army, with the rank of major-general; and to him is due almost entire credit for the excellent sanitary condition of the Panama Canal Zone (see PANAMA CANAL).

MAJOR-GENERAL GORGAS

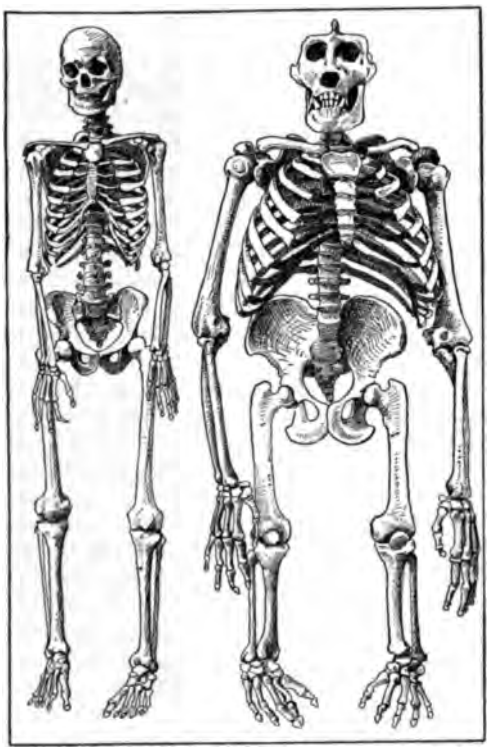
He was born at Mobile, Ala., studied at Bellevue Hospital Medical College in New York City, and in 1880 was appointed surgeon in the army. He rose through various ranks until in 1898 he was made chief sanitary officer in Havana, at the time of the occupation of Cuba by the United States army after the Spanish-American War. There he showed his exceptional ability, especially in the fight with yellow fever, applying methods which practically eliminated that disease from the island. In 1903 he was raised to the rank of colonel for his work in Havana, and in the next year he was appointed chief sanitary officer of the Panama Canal Commission.

The Canal Zone was possibly the most unhealthful and unsanitary spot in the two Americas where white men were forced to live, and Gorgas' work of improvement had to begin with fundamentals. Disease-breeding filth was cleaned up, marshes were drained, houses were screened against the infection-carrying mosquito, and within an incredibly short time the Zone was transformed from a deadly section into an area where men might live and work without danger to their health. Gorgas thus had a part in the construction of the canal comparing favorably with that taken by the great engineer, Goethals, for American engineering ability would have failed to accomplish the vast undertaking just as surely as had that of France, years before, except for the work of Gorgas and his assistant physicians and chemists.

In 1914 Gorgas was called to South Africa by the Chamber of Mines of Johannesburg, to investigate sanitary conditions in the Witwatersrand mines. He is a permanent director of the International Health Commission of the Rockefeller Foundation (which see), and has received many honorary degrees and medals.

GORGONS, *gawr'gonz,* three frightful beings of Greek mythology "whose glance was icy death," turning to stone all who looked upon them. The two older ones were immortal, but Medusa, the one best known, was mortal and met her death at the hands of Perseus. The hair of the Gorgons was a mass of serpents. their hands and teeth were of brass, and their bodies were covered with scales which could not be pierced. The name is from a Greek word meaning *grim,* and is often used to signify anything very hideous. See MEDUSA.

GORILLA, *go ril'a,* the largest of the anthropoid, or manlike, apes. The male is usually larger than a man, and stands fully six feet in height when in an upright position. The gorilla is a native of the forests of equatorial West Africa, chiefly in parts of the French Congo. A recognized authority, Prof. R. L. Garner, said, in 1916, that there were probably not more than 2,000 of them remaining in the world. Although the name is of ancient origin, practically nothing was known of these apes by white men until 1847, when Dr. Savage, a missionary in Gabun, on the west coast of Africa, sent two skulls to England. An American missionary had called the attention of naturalists to this new and strange animal a few months previously, but that there was such a beast was considered improbable. The first absolutely authentic accounts of this ape were furnished by Du Chaillu, in 1859, and



MAN AND THE GORILLA
Comparison of skeletons.

these established the fact that the gorilla did not belong to the same species as the chimpanzee, as had been previously supposed.

The gorilla is a huge, ungainly animal, with short legs and very long arms, the tips of the fingers reaching well below the knees. It is covered with a coat of coarse, matted, brownish hair. The strength of the animal is in proportion to its size, and it could with ease tear a man limb from limb. The long, canine teeth and lowering brows give an appearance of great ferocity to the male, which is belied by its somewhat timid habits.

THE GORILLA
Hand and foot.

As a rule the gorilla walks on all fours, but it occasionally rises upright and walks more naturally in that position than any other of the apes. By day, gorillas roam the forests

in family parties, searching for food. At night a sleeping place is made for the females and young by lacing boughs of trees together and covering them with branches and leaves. Prof. Garner, quoted above, compliments this animal on his domestic traits. He says that when the gorilla marries he "cuts out night life, the clubs, and everything of the kind."

The food consists of fruit, nuts, honey and eggs, and though a gorilla will not kill any animal for the sake of its flesh, it will eat meat if it can get it. The chief enemy of the gorilla and the only one it fears is the leopard; all other inhabitants of the forest are terrified by its loud, hoarse challenge. It will always flee from man in great fright, but if wounded or cornered it will make a terrific fight, rending and tearing with teeth and claws. Several captured specimens have been sent to Europe and America, but even with the greatest care they can not be kept alive for more than a few months. E.D.F.

GORKY, *gor'ke,* MAXIM (1869-), famous Russian novelist, fighter for Russian liberty, fearless champion of the downtrodden and oppressed, an exile by order of the Czar, and one of the leaders of the revolutionary and socialistic forces in modern Russia. His power and ability have challenged the attention of the world.

MAXIM GORKY

Gorky's real name is ALEXIS MAXIMOVITCH PESHKOV; "Gorky," which means *bitter,* is a fictitious name which he chose at the outset of his career and which has clung to him. Indeed, "bitter" is the word which tells the story of his childhood days in his native city, Nizhni Novgorod. He was deserted by his mother, and his father died when he was four years of age—this is the history of his life's beginnings; and its utter misery, coupled with an irrepressible desire to wander, led him later to become a peddler in the streets, a gardener, cook, railroad porter and clerk. But the privations of those days gave him the opportunity to study human nature at first hand, and his own career is more varied than any of the later inventions of his vivid imagination.

His writings have attracted attention, not because of their great literary qualities, but for their social significance. He takes his readers to the haunts of thieves, paupers and lepers, and without fear or favor shows the hearts of the forlorn and fallen. His characters are rebels and outcasts with very stormy careers, but they appeal powerfully to the Russian masses. Among his best-known books are *The Story of My Childhood Days, Song of the Falcon, Foma Gordyeeff, The Outcasts* and *Three Men.* He has also written several dramas, among them *At the Depths, The Children of the Sun* and *The Barbarians;* these, as well as all his later writings, concern themselves with the political situation in modern Russia.

In February, 1915, the Czar lifted the ban which had kept Gorky out of Russia for many years. At that time the great novelist, lingering in the last stages of tuberculosis, lived on the island of Capri, where he hoped the climate would bring relief to the malady. For pathos, picturesqueness and daring struggle, the career of Gorky is perhaps unequaled among the great leaders of the twentieth century. R.D.M.

GOS'HAWK, written in medieval English as *goshauk,* meaning *goose hawk,* is a species of falcon common to Europe, Asia and the north of Africa. It is rare in Great Britain, however, particularly in England. The goshawk, so named because it was first observed to fly at geese, was found to be easily tamed, and came into use for falconing. The female, which is much larger than the male, is flown at hares, rabbits and the larger game, and the male at the smaller birds, such as partridges. The American goshawk, a larger and more attractive bird, is a menace to small poultry, and is commonly called *hen hawk,* or *chicken hawk.* See FALCON, subhead *Falconry.*

GO'SHEN, in Biblical times a district or province in Egypt, adapted to raising flocks and herds, which was assigned by Joseph to his father Jacob and family when they entered the country to escape famine in their own land (*Genesis* XLVII). It was located on the eastern border of the Nile delta, a few miles to the northwest of On, and many of the Israelites lived there up to the time they were enslaved by the Egyptians.

GOSHEN, IND., the county seat of Elkhart County, in the north-central part of the state, is twenty-eight miles southeast of South Bend, ten miles southeast of Elkhart and 110 miles

east of Chicago. It is on the Lincoln Highway, and on the Lake Shore & Michigan Southern, and the Cleveland, Cincinnati, Chicago & Saint Louis railroads. Two electric lines connect with the large cities of the state. The area exceeds four square miles. In 1910 the population was 8,514; in 1916 it was 8,955, by Federal estimate.

Goshen is an attractive residential town, well located on the Elkhart River. It is the seat of Goshen College, a Mennonite School with academic and collegiate departments, Bible, normal and summer school, and schools of business, music and oratory. The city has a Federal building, a Carnegie Library and a hospital. The industrial interests of the town include lumber mills, foundries and machine shops, and manufactories of veneering, furniture, ladders, farm implements, rubber goods and cream separators.

Goshen was settled in 1828, and received its first city charter in 1858. The waterworks and electric light plant are owned and operated by the municipality. J.B.

GOSNOLD, *gos'nuld,* BARTHOLOMEW (? - 1607), an English navigator and explorer who was instrumental in securing the grants of American charters to the London and Plymouth companies in 1606. In 1602 he explored the coast of New England from Maine to Buzzard's Bay, returning to London with a valuable cargo of furs and woods which he had secured from the Indians in trade. In 1607 he was in command of one of the three vessels which carried the first colonists to Jamestown, Virginia, and was active in the affairs of the colonies. Death by fever ended a very promising career soon after his arrival in America.

GOSPELS, the first four books of the New Testament, in which the life and teachings of Christ are described by the men whose names the books bear; that is, Matthew, Mark, Luke and John. The word *gospel,* which formerly meant *good tidings,* now means *God's story,* or the story of Christ. The first three books have much in common, as they take Christ's ministry in Galilee for their main theme and say very little concerning His divinity, while John presents Jesus as the Divine Saviour of mankind. None of the gospels aims at giving a complete biography of Christ, but each is a collection of His deeds and words for doctrinal instruction. However, Christ's betrayal, arrest, trial, crucifixion and resurrection are so important that they are described by all. Matthew and John were Apostles, so they saw all the events which they recorded, while the other two learned their facts from eyewitnesses of the scenes.

The Gospel of Matthew, written from the Jewish point of view, sets Jesus forth as the royal Messiah, who came as the fulfilment of the law and prophecy of the Old Testament to establish the true kingdom of God in the world. The author presented Christ's teachings and the miracles which He worked, as well as the useless opposition of the Pharisees, to show that God's kingdom was meant to embrace not only Jews, but all nations.

The Gospel of Mark, the shortest of the four, was written by a Gentile to the Romans, and is full of action and power. In it the author represents mainly Christ's ability to save, as shown in His miracles. Its narrative consists of a series of scenes described in the order in which they occurred, with more stress laid on the deeds than on the teachings of Christ. Ancient tradition tells us that Mark's gospel presents much of Peter's preaching concerning Christ.

The Gospel of Luke was written for Jew and Gentile alike, so it is broader than the first two, and the author was especially fond of exhibiting Christ's favor to the fallen, the outcast and the poor. This gospel presents Christ as establishing a religion to uplift and save suffering humanity. Luke says that he bases his knowledge for the book on evidence from "eyewitnesses * * * * of the word," that is, the Apostles.

The Gospel of John tells more of Christ's labors in Judea and differs greatly from the other three by proclaiming the divinity of Christ and showing that the human Jesus is the eternal Son of God. Christ's teachings and works are described to show how He brings eternal life to those who receive Him. John thus presents the mission of Jesus as the climax of God's self-revelation. See BIBLE; APOSTLES. E.C.

GOSSAMER, *gos'a mer,* written in medieval English as *gossomer* or *gosesomer,* meaning *goose-summer,* is so called because of its downy appearance and the time of its arrival. It is a light, filmy substance, consisting of the webs produced from a sticky fluid ejected with great force by small spiders, and only, according to some authorities, when they are young. On clear days, particularly in the autumn, threads of gossamer may be seen in fields of stubble, on low bushes, and floating through the air. The single strands are so delicate as

to be almost invisible, but when blown about by the wind they unite and form thicker threads. The name is also applied to a variety of gauze which is much used for ladies' veils. It is very delicate in texture, yet strong.

GOSSE, *gos,* EDMUND WILLIAM (1849-), English poet, student and critic of literature, and one of the most active of writers. He was born in London. From 1875 to 1904 he was translator to the London Board of Trade, and since 1904 has been librarian of the House of Lords. He has specialized in the study of Scandinavian literature, and has published a volume of *Studies in the Literature of Northern Europe.* Notable among other works are *From Shakespeare to Pope; An Inquiry into the Causes of the Rise of Classical Poetry in England; History of Eighteenth Century Literature,* and *History of Modern English Literature.* His poetry, which is contained in *Madrigals, Songs and Sonnets, On Viol and Flute, In Russet and Silver,* and other collections, is graceful and musical, and his prose has a distinct charm.

GOSSE, PHILIP HENRY (1810-1888), an English zoölogist, was born at Worcester. He traveled extensively in the United States, England, Canada and Jamaica to study various phases of animal life, and did much to advance the science of marine zoölogy. His influence in this direction was far-reaching and permanent. In 1856 he was made a Fellow of the Royal Society. His writings include *The Canadian Naturalist, Evenings with the Microscope* and *Marine Zoölogy.* His son, Edmund William Gosse, is the author of many popular works. See GOSSE, EDMUND WILLIAM.

GOTH'AM, a name applied somewhat derisively to New York City by Washington Irving in 1807 in his book *Salmagundi.* As early as the fourteenth century the "fools of Gotham" are mentioned in literature, the name being derived from a parish in England whose inhabitants were noted for their follies and their simplicity. According to the story, King John, on his way through the country, sent word to the Gothamites to prepare to entertain him. They pretended to be imbeciles to avoid the expense, and the king journeyed elsewhere. "As wise as the men of Gotham" after that grew into a proverb to mean *worldly wisdom.*

GOTHENBURG, *got'en burg,* or **GÖTEBORG,** next to Stockholm the largest and most important city in Sweden. It is the capital of the Län, or province, of the same name, and is a remarkably picturesque, well-built city, on a level plain about four miles from the mouth of the Göta-Elf, in the Kattegat. The chief industries are cotton spinning, sawmilling, shipbuilding and the manufacture of iron and steel. An extensive trade is conducted, the harbor, accommodating vessels drawing twenty feet of water, being rarely blocked with ice. One-fourth of the foreign commerce of Sweden passes through Gothenburg. The city has an excellent university supported by private funds, with about 2,000 students, and technical, nautical and commercial schools. Population in 1912, 173,875.

GOTHS, a powerful Germanic tribe of ancient times, which was connected in an important way with the history of the Roman Empire. In the fourth century before the Christian Era the Goths dwelt upon the shores of the Baltic Sea, but little is known of them until early in the third century A. D., when they were settled about the mouths of the Danube River. There they grew rapidly in numbers and in strength, and by the middle of the century had begun to invade the Roman province of Dacia. During many years of warfare they held their own against the Roman armies sent to drive them back, and in 272 Dacia was ceded to them by the Emperor Aurelian. About a century later they divided into the Ostrogoths (Goths of the East) and the Visigoths (Goths of the West), the former dwelling on the shores of the Black Sea, the latter inhabiting Dacia and the banks of the Danube River.

The Visigoths. In 395 a great army of Visigoths, led by the renowned King Alaric (which see), invaded Greece and laid waste the Peloponnesus. Alaric ceased his depredations only when the governorship of Illyricum was promised him. In 410 he stormed and sacked Rome, and was preparing to lead his forces to Sicily when he died. Under his successors a powerful Visigothic kingdom was established in Southern Gaul (the southern part of modern France) and Spain. In 507 Alaric II, king of the Visigoths, was defeated by the Frankish king, Clovis (which see), and the territory of the Visigoths as far south as the Pyrenees Mountains was added to the kingdom of the Franks. The Visigothic kingdom in Spain endured until 711, when the last king, Roderick, was slain in a battle with the Moors.

The Ostrogoths. In the latter part of the fifth century the Ostrogoths were given permis-

sion to settle in Pannonia, a Roman province between the Danube and the Save rivers. Theodoric, their most celebrated ruler, who became king in 476, invaded Italy in 488, and in 493 defeated and slew Odoacer, the barbarian chief who was then on the throne of Italy. Theodoric ruled the country with great vigor and ability until his death, in 526. For several years thereafter the Ostrogoths were warred upon by the armies of the Eastern emperors, and about 554, broken and scattered, they disappeared from history as a separate nation. See THEODORIC; ODOACER.

Consult Bradley's *The Story of the Goths;* Gibbon's *Decline and Fall of the Roman Empire.*

GOTTSCHALK, *got'shahlk,* LOUIS MOREAU (1829-1869), an American musician, born in New Orleans, La. He began to compose at the age of sixteen, and made successful concert tours in France, Switzerland, Spain, South America and the United States. In these he played chiefly his own compositions and conducted his orchestral works. He composed extensively for the piano, *The Last Hope* being considered his masterpiece. His works have an originality and charm which were greatly enhanced by the freshness and passion of his playing. He is remembered as a gifted performer rather than a composer.

GOUGH, *gof,* JOHN BARTHOLOMEW (1817-1886), a temperance orator of remarkable magnetism, who early in life was a drunkard, with only disreputable men for his companions. After terrific struggles he got control of himself and became America's foremost temperance worker. Gough was born in England, but his parents moved to the United States when he was a child.

After the death of his mother he gave himself to debauchery, earning a meager living by singing in saloons and concert halls. He was induced to sign a pledge, but there were many lapses. However, once master of himself, he never fell again. From that time on he devoted his energies to the lecture platform in behalf of temperance, traveling in America and England, always holding himself up as an example to all who would heed his pleas. He was the leader of the red-ribbon movement; during its vogue literally millions of people wore little red-ribbon badges as the visible token of a written pledge to abstain from alcoholic drink. He died while delivering a lecture in Frankford, Pa. He published a series of *Temperance Lectures* and *Temperance Addresses,* and a volume of sketches, *Sunlight and Shadow; or Gleanings from My Life Work.*

GOUIN, *goo aN',* SIR LOMER (1861-), a Canadian barrister and statesman, premier and attorney-general of Quebec since 1905. He was born at Grondines, Que., attended Sorel and Lévis colleges, and was graduated from Laval University in 1884. In the same year he was called to the bar, his success in his profession being immediate. He was an unsuccessful candidate for the House of Commons in 1891, but in 1897 was elected to the Quebec assembly. He became one of the leaders of the Liberals, was commissioner of public works from 1900 to 1904, and then in 1905 was called on to form a ministry. He was made a Knight Commander of the Order of Saint Michael and Saint George in 1908, and in 1910 was chosen batonnier-general of the Quebec bar, a tribute to his professional standing.

He was chairman of the Interprovincial Conference at Ottawa in 1906, and was a delegate to a similar conference in 1910. The honorary degree of LL.D. was conferred on him by Laval University in 1902, McGill University in 1911 and the University of Toronto in 1915. In the words of the chancellor of the last institution, "By common consent, by the judgment and verdict of public opinion, Sir Lomer Gouin is to-day regarded by the people of Quebec as one of the most distinguished, most capable and most praiseworthy men in Canada." G.H.L.

GOUJON, *goo zhoN',* JEAN (1520?-1572?), the most distinguished sculptor produced by France in the sixteenth century. During most of his career he worked in collaboration with the famous architects of his day, and it is in the wonderful harmony between his sculptures and the architecture which they adorned that his fame as an artist consists.

Although evidence has been offered justifying the date 1520, the time and place of Goujon's birth are still uncertain. In 1561 an attempt was made to turn out of the royal employment all those who were suspected of Huguenot (Protestant) tendencies. Goujon had always been claimed as a reformer, and it is possible that he was one of the victims of the attack. At any rate, from this time on all trace of him was lost.

Goujon worked with the architect Pierre Lescot, the celebrated architect of the Louvre, and among his famous productions are several bas-reliefs which he designed for the church of Saint Germain l'Auxerrois in Paris, and a

wonderful series of fountains near the Cemetery of the Innocents. These fountains were later removed and arranged in a public square, where they still are known as the Fountain of the Innocents. Goujon executed many carvings for the Louvre, and his most notable contribution to this wonderful structure is the Gallery of Musicians. His death is said to have taken place during the Saint Bartholomew Massacre in 1572.

GOULD, *gould*, the name of an American family which won a position of commanding influence in business and finance. Its most famous member, Jay Gould, was a remarkable railroad financier. Two of his children, George Jay Gould and Helen Miller Gould Shepard, attained special prominence, one as a business man and capitalist, the other because of her generous and noble efforts to make the world better.

Jay Gould (1836-1892) was born in Roxbury, N. Y. He received an academy education, and at the age of sixteen began work in a hardware store. Four years later he entered the tanning and lumber business, in 1857 became a bank director in the little town of Stroudsburg, Pa., and soon began to buy railroad stock. This stock he disposed of at a handsome profit after the financial panic of 1857, and with the money thus gained he purchased a controlling interest in the Rutland & Washington Railroad between Troy, N. Y., and Rutland, Vt., becoming its president, treasurer and general manager.

In 1859 he removed to New York, where he entered upon a career that was destined to have far-reaching effects in the history of American railroads. He began by obtaining control of the Erie Railroad when it was in financial straits, and in 1868 was elected its president. By a similar method, that of depressing the value of the stock in the open market and then buying during the period of depression, he eventually added to his railroad holdings until in 1880 he controlled 10,000 miles of road, nearly one-third the mileage of the entire country. Among the lines which came under his control were the Union Pacific, the Missouri Pacific, the Wabash, the Texas Pacific and the Saint Louis & Northern.

The consolidation of the various competing telegraph lines into the Western Union Telegraph Company in 1881 was also due to his genius for engineering great enterprises. Probably the most spectacular of his financial moves occurred in 1869, when he and James Fisk attempted to "corner" the gold mark The result of this was the disastrous financ panic of September 24, whose place in hist is known as "Black Friday" (which s Gould's fortune, at his death, was estimated be $72,000,000.

George Jay Gould (1864-), eldest son Jay Gould, was born in New York City a was privately educated. At the age of twen one he succeeded his father as partner in t banking house of W. E. Connor & Compa of New York, and three years later ente the railroad service as president of the Lit Rock & Fort Smith Railway. Under his a management the Gould interests were extens until they embraced a total railroad mile of more than 21,000, besides large holdings other great corporations.

In 1893 he became president of the St Louis, Iron Mountain & Southern, of t International & Great Northern, and of t Missouri Pacific roads, and from 1892 to 1 was at the head of the Manhattan Eleva Railway of New York City. Through h initiative the Wabash, one of the Gould lin became a transcontinental system, with Bal more as its Atlantic port, and he also brou about a friendly alliance between the Go and Rockefeller interests. In 1914 he h control of the Wabash system and his pos as a railroad magnate weakened.

Helen Miller Gould Shepard (1868-), w for years devoted the greater part of t fortune left her by her father to the welf of humanity, is the eldest daughter of J Gould. She became interested in philanthro work early in life. When the Spanish-Am ican War broke out in 1898 she gave $100,0 to the United States government for sanit and hospital uses, and at Camp Wikoff, a Montauk Point, Long Island, personally help in the care of sick and convalescent soldi besides donating $5,000 for supplies. Ot notable gifts include the library building New York University, a $500,000 donation Rutgers College, and one of equal value the school of engineering of New York U versity, and a generous contribution to t Hall of Fame which see. She has also b deeply interested in many work among t children of the poor. In 1913 Miss Go married Finley J. Shepard, a prominent m way official. She is a member of the bo of the Russell Sage Foundation, and of t Women's International War Relief Associati and holds honorary degrees from New Y

ersity and the American College for Girls urkey. B.M.W.

UNOD, *goo no'*, CHARLES FRANÇOIS (1818-), a great musician, whose fame as a com- r rests upon his popular opera *Faust*. He born in Paris, studied at the Conservatoire later in Rome, where his musical instincts m to have mainly ec- astical. In t, for two s he studied ology with idea of en- g holy or- , but what equently was Church's loss me the gain the musical

GOUNOD

d. His *Saint Cecilia's Mass* and the two orios, *The Redemption* and *Mors et Vita* ath and Life), are his most successful ef- in the domain of "religious" music. *eo et Juliette* almost rivaled Faust in the tions of the musical public.

the outbreak of the Franco-German War 70 Gounod took refuge in England, where emained and made his home for many s. In 1871 he composed his "Biblical ," *Gallia*, and also many songs, by which ecame popular in America; two of these *Maid of Athens* and *There is a Green far Away*.

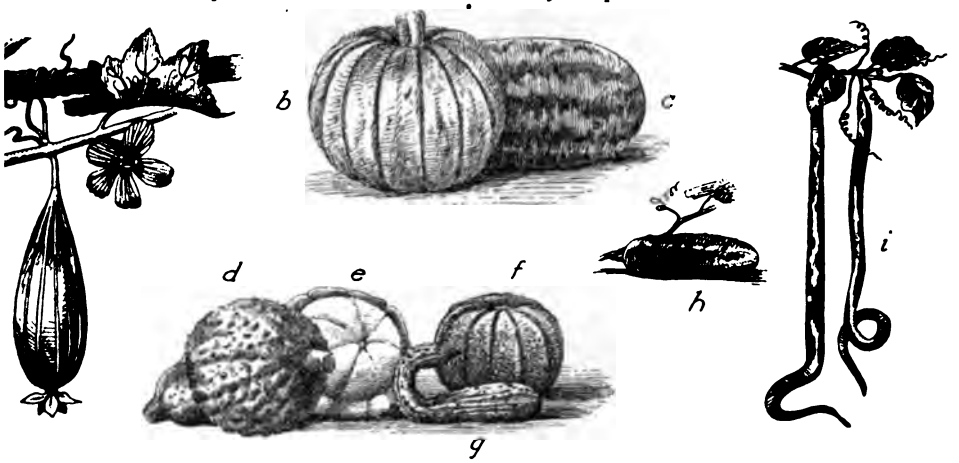
wo extracts from his private letters throw on the composer's philosophy of life:

Friendship and music, at one and the same time, form a small part of that state of bliss which will consist in the "simultaneousness of all joys."

We are not in the world to do what we wish, but to be willing to do that which it is our duty to do.

GOURD, *gohrd,* or *goord,* a popular name for a family of ornamental trailing or climbing vines, bearing hard-shelled fruits of various shapes. In its wider sense the term also includes squashes and pumpkins, which really belong to the same family, as also do melons and cucumbers. These last differ from the typical gourds in that they are in part edible.

When a large amount of vine is desired quickly, to cover arbors, waste places or walls, gourds are very desirable. If the seed is planted in light, rich soil in a sunny location, when danger of frost is over, they are easily cultivated and require about the same care as squashes. These vines produce large, alternate leaves with pointed lobes, and blossoms which are yellow in most species and often striking and handsome. The fruits of various species appear in many shapes and markings, and may be put to a number of uses.



VARIOUS GOURDS

(a) Dishrag gourd; (b) pumpkin; (c) watermelon; (d) Hubbard squash; (e) mammoth white squash; (f) muskmelon; (g) crookneck squash; (h) cucumber; (i) snake gourds.

Varieties and Uses. The *dishcloth,* or *towel, gourd* is a species which has become prominent in America. The interior of the dried fruit is fibrous, and, when properly prepared, makes a dishcloth or bath sponge which is always sweet and clean. Very young fruits of this variety are edible.

The *bottle gourd,* also called *sugar trough,* produces bottle-shaped fruits which, when dried and emptied of seeds, are excellent for carry-

ing water, which remains cool in such a vessel. Pilgrims in the Orient used bottle gourds, and they might be called the original thermos bottles.

Another species, the *nest-egg gourd,* produces small, egg-shaped fruits, which may very well be used as nest-eggs, as the name implies.

Other species are the *dipper, pipe gourd* or *calabash, apple-shaped, orange, pear-shaped, powder horn* and *Hercules club.* All can be used as dippers, and they are ornamental and excellent as toys for children. A gourd in which the interior has dried and the seeds have loosened makes a good, natural rattle for a baby. M.S.

GOUT, *gowt,* a constitutional disorder, chiefly in the male sex, occurring in paroxysms of severe pain in the great toe, in the heel, or in the calf of the leg. It often spreads to the larger joints and the internal organs, and is usually accompanied by acute indigestion.

The disease is due to an excess of uric acid in the blood. Indolence, inactivity and intemperance in eating rich foods and drinking fermented liquors are the principal causes. Gout may be acquired or it may be hereditary. If the former, it rarely appears before the victim reaches the age of thirty-five; if the latter, it is frequently observed earlier. Strict regulation of the habits of life is an important factor in the treatment of gout.

GOV'ERNMENT, the political machinery by which a community or state exercises control over its public affairs; the term also popularly embraces the body of men through whom this control is exercised. Official oversight of all the public affairs of men and also of many of their more private undertakings has been necessary since people first came into contact with each other. Every man has a right to a certain degree of personal liberty. He is not to be denied this right so long as in its exercise he does not encroach upon the rights of others. One man cannot take from another any privileges he may justly claim for himself. If among inalienable rights are those of "life, liberty and the pursuit of happiness" then all men must consent to such control as will preserve the balance between right and wrong in human affairs.

The general purpose of all government is broadly stated in the preamble to the Constitution of the United States, namely, "to establish justice, insure domestic tranquillity, provide for the common defense, promote the general welfare and secure the blessing of liberty * * * ." To attain these ends a government defends the people against foreign aggression; supports courts of justice; regulates property rights of individuals, and determines the political rights and duties of citizens or subjects and the privileges of aliens.

A government assumes control of various matters directly relating to the welfare of its people which might conceivably be trusted to private enterprise. It coins money; regulates trade and commerce; maintains roads, highways and postal systems; provides sanitary regulations; enforces public education, and cares for the sick and the poor. As to the extent to which a government should control at least a few of the functions above noted, statesmen are unable to agree. Some contend that all matters should be left to individuals to the limit of their ability to manage affairs, while others, on the contrary, would have the field of governmental action greatly extended. The extreme of this latter view is represented by the theories of socialism; the socialists would have the government not merely regulate all great public business enterprises but actually own and operate most of them, such as railroads, telegraphs, express companies, and the like. The argument directly opposed to state ownership and control and representing the extreme of individual liberty is offered by nihilism and in the theories of the anarchists; both of the latter would use force to abolish all centralized authority and to substitute absolute individual freedom.

Some kind of government has existed among peoples from the earliest times, but while scientific development has been steady, there is not yet a normal or absolute type which may be pointed to as a fairly perfect model. Governments have grown, developed and changed with the advancing times; all countries are more carefully administered to-day than formerly, but no two nations employ exactly the same means to put into effect their policies. With respect to their nature, governments may be classified broadly as *autocratic* and *constitutional,* or *popular.* In the former, power is exercised without restraint by an individual or by a few selected members of the state; in the latter, comprising republics and limited monarchies, power is vested in the entire body of persons who compose the state, and these delegate immediate authority to their agents. Only constitutional governments "derive their just powers from the consent of the governed." Of autocratic governments the

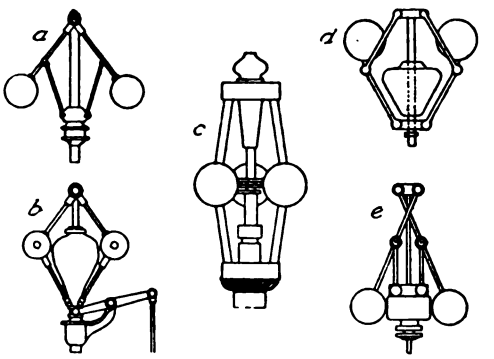
ARCTIC OCEAN
GREENLAND
SPITZBERGEN
Barents Sea
FRANZ JOSEF LAND
ARCTIC CIRCLE
ALASKA
DOMINION OF CANADA
NORTH AMERICA
Bering Sea
UNITED STATES
ATLANTIC OCEAN
PACIFIC OCEAN
BERMUDAS
HAWAIIAN ISLANDS
TROPIC OF CANCER
CUBA
WEST INDIES
CENTRAL AMERICA
EQUATOR
SOUTH AMERICA
BRAZIL
POLYNESIA
OCEANIA
TROPIC OF CAPRICORN
C. Horn
RUSSIA
RUSSIAN EMPIRE
ASIA
CHINESE EMPIRE
PERSIA
ARABIA
EGYPT
AFRICA
INDIA
CEYLON
SUMATRA
JAVA
PHILIPPINE ISLANDS
MICRONESIA
MELANESIA
AUSTRALIA
NEW ZEALAND
TASMANIA
KONGO STATE
ANTARCTIC OCEAN
ANTARCTIC CIRCLE
STATE ORGANIZATIONS
CONSTITUTIONAL MONARCHIES
DESPOTIC AND ABSOLUTE MONARCHIES
CENTRALIZED REPUBLICS
FEDERATIVE REPUBLICS
COLONIES AND PROTECTORATES in LIGHTER TINT
Hammond's 9 x 7 Map of the World
Showing State Organizations
Copyright, 1909 by C. S. Hammond & Co., N.Y.
C. S. HAMMOND & CO. N.Y.

world has few modern examples; that of Turkey is the most prominent, although Russia was a pure autocracy prior to 1907. Of popular governments the early democracy of Greece is usually cited as the most striking ancient example; numerous attempts at republican institutions have been made in various countries of every era since the Greek, but the United States, Switzerland, France, Brazil, Chile and the Argentine Republic, are the only conspicuous present-day examples of important countries in which republican government appears to be successful and permanent.

The mere form and name of a government are not sufficient to place it in one or the other of the above classes. A republican form existed in Rome long after the assumption of power by the emperors, while on the other hand, most of the so-called Spanish-American republics of the present day are scarcely more than autocratic control in disguise. It may be noted also that the present régime under the king of England, known as a monarchy, is in reality controlled and managed by the people and is therefore republican in fact. The monarchical is still the prevailing world type, except on the two American continents, yet in nearly every monarchy the royal power has been partially transferred to the people by means of legislative bodies, the members of which are elected directly by the people. The present governments of the United States and Great Britain are the best types of popular control in the world to-day. They differ in many features. W.B.G.

See ARISTOCRACY; MONARCHY; REPUBLIC; also, in alphabetical order, concrete descriptions of the government of each country, state and province. At the end of the article CIVIL GOVERNMENT numerous topics of interest in this connection are indexed. The following books are recommended: Beard's *American Government and Politics*; Lefroy's *Canada's Federal System*; Bryce's *The American Commonwealth*.

GOV'ERNOR, a mechanical device for controlling the speed of steam engines and motors. The usual form consists of an upright shaft kept revolving by power supplied from the engine and supporting a pair of metal balls. If the speed of revolution becomes too great the two balls are compelled by centrifugal force to fly farther apart. By this action a valve connected with the cylinder is opened and steam is allowed to escape until the normal speed is again reached. Should the speed be too slow the balls fall closer together and automatically open a valve which admits more steam to the cylinder. Governors differ in design but the object of all is the same.



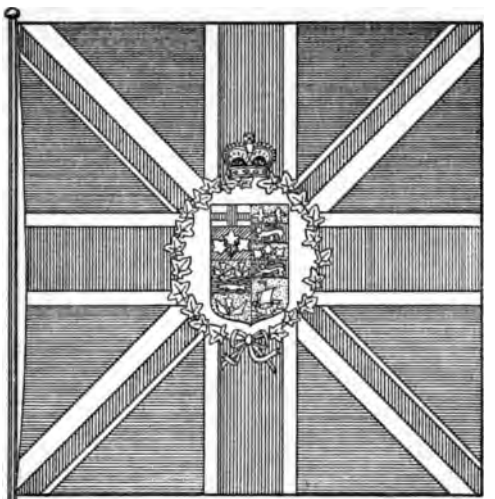
GOVERNORS

(*a*) The simplest form, called Watt's governor; (*b*) Porter's; (*c*) Pickering's; (*d*) Pröll's; (*e*) spring governor.

GOVERNOR, the chief executive of each state of the American Union, elected by the people for a term varying from one to four years. One of the duties of the governor is to report to the legislature the general condition of the state and to recommend needed legislation; he also has power to convene the legislature in special session. In nearly all states, before a bill becomes a law, it must have his signature, and if he vetoes a bill it is returned to the legislature for reconsideration. The power of pardoning criminals is generally vested in him, although a number of states have created pardoning boards which share this power with the governor. He appoints minor state officers and in some states the members of commissions and boards, but confirmation is usually required by the Senate in these cases. The state constitution requires that the governor faithfully execute the laws, and he is commander-in-chief of the state militia. Salaries of governors range from $2,500 to $12,000 per year, in the various states.

GOVERNOR-GENERAL, the personal representative of the English sovereign in Canada, and under the king the executive head of the Dominion government. In all executive functions relating to the internal interests of the provinces he acts with the Privy Council, and is bound by the advice of its members, but has the power of reserving for the consideration of the imperial government any proposed legislation which in his opinion endangers imperial interests. The Governor-General's position is therefore dual; he knows no superior other than his sovereign when royal rights are threatened, but is a servant of the Do-

minion in purely local affairs. His attitude toward Canadian political factions is that of strict neutrality. He is appointed by the English ruler, usually for a term of five years; his salary is $50,000 per annum. See CANADA, subtitle *Government*.



FLAG OF THE GOVERNOR-GENERAL

GOVERNOR'S ISLAND, a small island in the Bay of New York, near the lower end of Manhattan Island, at the entrance to East River. Originally it comprised sixty-five acres, but this area has been almost doubled by the addition of filled-in land. It is used entirely by the United States government for military purposes, and besides forts Jay, Castle, William and South Battery, for military protection of the great metropolis, contains buildings for the principal commanding officers.

GRACCHUS, *grak'us,* the name of a distinguished Roman family, of which the following were prominent members:

Tiberius Sempronius Gracchus, a Roman magistrate (born about 210 B.C.), who also served as a general in Spain and Sardinia. He married Cornelia, daughter of Scipio Africanus the Elder, and was the father of the two best-known Gracchi, to whom their mother referred as her jewels.

Tiberius Sempronius Gracchus (?160-133 B.C.), a Roman politician, served under his brother-in-law, the younger Scipio Africanus, at the siege of Carthage and was the first man to mount the walls. He was appointed quaestor in 137 B. C. in Spain and served there in the Numantine war. In 133 B.C. he was elected tribune of the people and sought to introduce land reforms to improve the condition of the poorer classes. At the end of his term he tried, contrary to the laws, to secure reëlection, and was killed in the disturbance that followed.

Caius Sempronius Gracchus (158-121 B.C.) was a quaestor in Sardinia in 126 B.C. and was afterwards elected tribune of the people. He renewed the law of his brother, and tried to substitute a democracy for the existing aristocratic form of government. He was reëlected to the tribuneship in 122 B. C., but became unpopular and failed to win the office a third time. Riots ensued, and at his own request Caius was killed by his slave. See TRIBUNE; QUAESTOR.

GRACE, DAYS OF, three days allowed in which to make payment of a note or draft after the day on which it becomes due. These days were formerly allowed as a favor, and the name arose from this fact, but the courts sanctioned the custom and it grew into law which remained in effect for many years. No days of grace are now allowed in over half of the states of the Union, except on sight drafts. Bankers' checks and notes on demand are payable without grace, and no days of grace are allowed on time paper. In the United States, when the last day of grace (in states where allowed) falls on a legal holiday or Sunday, the note is payable on the first business day thereafter, but in England and Canada on the preceding day.

GRACES, THE THREE, in Greek mythology, the daughters of Zeus and Eurynome, the three goddesses who presided over the dance, the banquet and all kindred pleasures and polite accomplishments. The English poet Spenser describes them in these words:

> These three on men all gracious gifts bestow
> Which deck the body or adorn the mind,
> To make them lovely or well-favored show;
> As comely carriage, entertainment kind,
> Sweet semblance, friendly offices that bind,
> And all the complements of courtesy;
> They teach us how to each degree and kind
> We should ourselves demean, to low, to high,
> To friends, to foes; which skill men call civility.

In the writings of the Greek poet Hesiod they are given the names of Aglaia (Brightness), Euphrosyne (Joy) and Thalia (Bloom). Homer represents them in the *Odyssey* as the attendants of Aphrodite. In art they are grouped together, usually embracing each other or clasping hands. There is a well-known painting of the Three Graces in the Louvre,

Paris, the work of a French artist, Jean Baptiste Regnault.

GRACKLE, or **GRAKLE,** *grak''l,* in America, the name applied to various kinds of blackbirds, the best known of which is the purple grackle, or crow-blackbird, common throughout the Eastern and Central United States and northwestward to Alaska. In India and in Europe the name is given to various birds of the starling family which show considerable intelligence; they readily learn to perform various amusing tricks, and can imitate the human voice.

GRADY, *gra'di,* HENRY WOODFIN (1851-1889), an American orator and journalist, whose splendid work as editor of the Atlanta *Constitution* from 1880 to his death was an important factor in uniting the South and the North after the War of Secession. He was born in Athens, Ga., and after being educated at the University of Georgia began his work as a journalist in a series of letters on the resources of his native state. As correspondent of various publications he attracted wide notice by his articles on building up the South, while "The New South" was his chief topic as an orator. In Atlanta the Grady Memorial Hospital was erected in appreciation of Mr. Grady's work.

GRAFT'ING. If a bud or twig from one plant be inserted in a cut made in the surface of another, of the same or a related species, in such a way that there can be a circulation of sap between the parts, the two will unite and a new growth will result. This operation, known as *grafting,* or *graftage,* is a method of propagating plants which is employed in the culture of nearly every kind of fruit tree and of numerous flowers, ornamental trees and shrubs. The portion upon which the detached shoot is inserted is called the *stock;* the transferred part is called the *cion* (or *scion*), and the new growth the *graft.* The practical value of this form of plant husbandry is unquestioned, but its full possibilities and its limitations can be learned only by direct study and experiment.

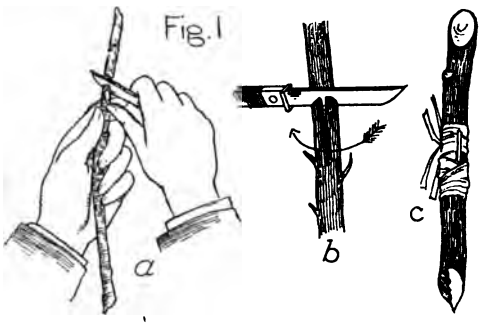
Purposes of Grafting. The fundamental object in grafting is to perpetuate a variety which does not reproduce by seeds, and which cannot be grown from cuttings with economy. The art of graftage, however, has several other distinct advantages. It is employed in many instances to increase the rate and ease of multiplying plants, for the new growths are borne upon old roots or branches, and the time necessary for producing new roots is saved. Grafting also may bring about a desired change in the character or habit of cion or stock. Such a change may be the dwarfing of a certain variety, a device sometimes employed to increase the yield of a plant, for checking growth usually promotes fruitfulness. New varieties are also developed, having characteristics of the two plants which have been united.

Again, plants are sometimes adapted to unfavorable soils by means of graftage, as in the case of certain varieties of plums, which ordinarily flourish only in heavy soils. When grafted on the peach such plums thrive in light soils, and peaches can in the same manner be made to grow in heavy soils. The fruit-grower also resorts to graftage to adapt his plants to unfavorable conditions of climate. The date of fruit-bearing is frequently advanced by inserting cions from young orchard trees into the stocks of old trees. This process is of special advantage to nurserymen who wish to test new orchard fruits. Finally, fruits are increased in size, and their flavor and keeping qualities are improved by graftage. The art is also employed successfully in modifying the colors of foliage, flowers and fruit.

General Methods. Though the methods of grafting are numerous and varied, there is one thing absolutely necessary for success, and that is to have the *cambium* layer of the cion coincide at some point with the corresponding layer of the stock. The cambium layer is the living tissue in plants, the part through which rises the sap that nourishes them. In the spring, when it is in a soft, mucilagelike condition, it readily heals and unites wounded surfaces. For this reason spring is the most favorable time for grafting most plants. However, the locality, the kind of plant, the climate and the object in view must all be taken into consideration, and no unvarying rule can be stated as to time or method of starting new growths. The wood for cions is taken when the plant is in a resting condition, preferably in the autumn after the leaves have fallen and before the time of heavy frosts. The cions are then placed in moist soil or sand, where they will be protected from freezing but not have sufficient warmth to cause the buds to swell. Sometimes, however, cuttings are taken in the spring, at or just before the time of graftage.

The three general kinds of graftage are *bud grafting, cion grafting* and *inarching.* Each of these can be subdivided into several classes, but only the standard methods in common use are discussed in the subheads below:

Bud Grafting, or *budding,* consists in applying a single bud to the cambium layer of the stock. It is a form of graftage that is employed in the culture of nearly all young fruit trees and of roses and many ornamental trees.

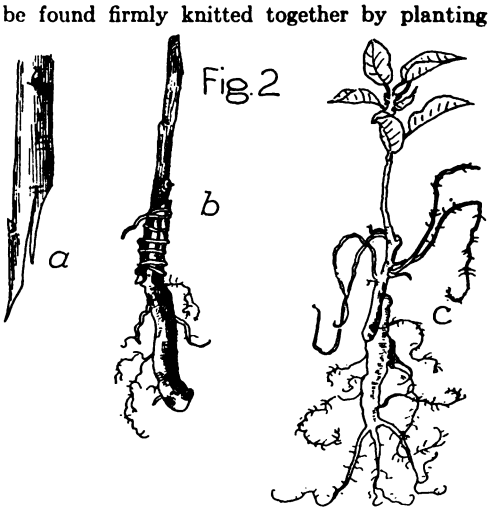


(*a*) Cutting the bud; (*b*) preparing the stock; (*c*) the bud tied.

It is performed most successfully in dry, clear weather and when the bark peels easily. The transferred part, which includes a healthy bud from a twig of the current season's growth, a portion of bark, and a bit of wood beneath the bud, is secured by placing the thumb beneath the bud and cutting a shield-shaped section out of the bark (see Fig. 1, *a*). The entire severed portion is technically known as the *bud.* A part of the stalk of each leaf is usually left on the bark to serve as a handle in inserting the bud. Some nurserymen remove the attached wood, but buds appear to thrive equally well whether the wood is cut off or retained. Two incisions are made in the bark of the stock, one vertical and one crosswise; the latter is made across the top of the vertical cut, forming a T-shaped wound (Fig. 1, *b*). The workman then inserts the bud into the cleft, pushing it down part way with the fingers and completing the operating by striking the leaf-stalk handle with the back of his knife-blade. Usually the bark has to be loosened to permit the bud to enter the cleft. Finally, the wound is closed and bound securely with a soft cord that will yield a little as the bud and bark expand (Fig. 1, *c*).

Cion Grafting, or *grafting proper,* is the insertion of a detached twig, bearing one or more buds, upon the surface of the stock. It is done in a great variety of ways, to which many special names are given. In regard to the place where the grafting is done there are four general methods—*root, crown, stem* and *top* grafting. Classification according to manner of operation gives rise to such terms as *cleft, whip, bark, saddle* and *splice* grafting. Of these methods the ones most generally used are whip grafting and cleft grafting.

Whip Grafting, also known as *tongue grafting,* is the favorite method for grafting cions on roots. The stocks are dug up in the fall and stored until January or February, when the grafting is begun. Both the stock and the cion are cut smoothly and diagonally, the cut surface being from one to two inches across. A vertical cleft is then made in each surface, so the two parts will have notches and tongues that exactly fit into each other (Fig. 2, *a*). Cion and stock are then joined, the tongue of the cion being pushed into the cleft of the stock. The joint is then securely wrapped (Fig. 2, *b*). Waxed string, or bands made by spreading melted wax over thin muslin and cutting it into narrow strips when dry, are excellent for this purpose. The grafts are packed away in sand, moss or sawdust in a cool place and left until spring, when they are planted. If the storage place is not above 40° in temperature the two parts of the graft will be found firmly knitted together by planting

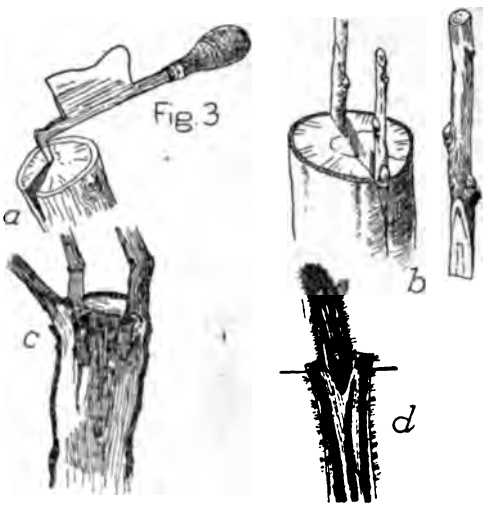


(*a*) Cion; (*b*) root graft; (*c*) growing root graft.

time, and in good condition. Grafts stored in warm, close cellars are liable to rot.

The length of cion and stock varies, but in severe climates it has been found advisable to use a cion from eight inches to a foot long and to graft it on a short root. The graft is placed in the soil in such a way that only the topmost bud is left exposed, and as the plant grows roots are sent out from the cion. The tree thus becomes "own rooted," and is thought to be hardier than one which obtains its nourishment only from the roots of a stock. Fig 2, *c,* shows a cion which has sent out roots.

Cleft Grafting is especially adapted to trees too large for whip grafting, and is the method almost universally employed for top grafting old trees. Cions for spring grafting are usually cut in late fall or winter, and stored until

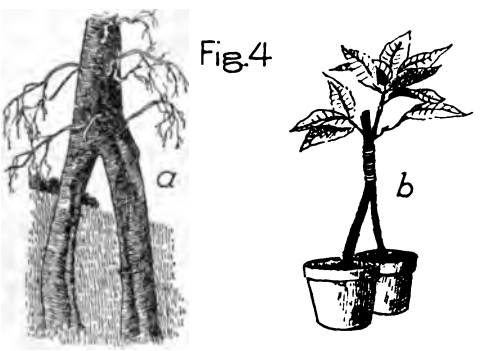


(*a*) Opening slit with grafting chisel; (*b*) cleft-graft cions inserted in stock; (*c*) vertical section of a cleft-graft a year after setting; (*d*) cleft-graft of cactus.

spring. The stock, a branch from one to one and one-half inches in diameter, is cut off squarely, forming a section with a smooth, flat end surface. This end is then split, and into the cleft is inserted a cion with a wedge-shaped base (Fig. 3; *a, b*). Usually the cion has three buds, the lowest one being just above the wedge-shaped section, and its sides are cut smooth and even. It is necessary to have the outer edge of the wedge a little thicker than the inner one, in order that the stock may press upon it and hold it securely at the point where the union first takes place. The end of the stock, known as the *stub,* is usually large enough for the insertion of two cions, one upon each side of the split. Not only does the double grafting increase the chance of success, but it also has the advantage of hastening the healing of the wound, which is thoroughly covered with wax to exclude air and moisture. Fig. 3, *c,* shows a vertical section of a cleft graft a year after setting. Cleft grafting is also used on cactuses, and on peonies, dahlias, hollyhocks and other thick-rooted plants. In the case of the cactus the cion is held in place with a cactus spine or pin, and bound with cord, waxing being unnecessary (Fig. 3, *d*), as the plants are very hardy and survive extreme conditions.

Other Methods. *Bark* grafting is exceedingly useful in repairing large trees whose branches have been broken off. The cions are pushed down between the bark and the wood at places where the bark is loosened for that purpose. The cions, several of which may be inserted in one stub, must be cut very thin so they will not injure the bark of the stock. They are held in place by a tight bandage, and wax is also applied, as in cleft grafting. This operation is known also as *crown* grafting. *Saddle* grafting is frequently employed in the propagation of shoots of small plants. The stock is given a wedge-shaped end, and the cion split and set upon this. The joint is then tied and waxed. *Splice* grafting is a useful method for working upon small shoots whose wood is too soft and tender for splitting. The two parts are simply cut across diagonally, laid together and secured by means of string and wax.

Inarching, or *grafting by approach,* is a process that sometimes occurs in nature without the aid of man; the union of the two oak trees shown in Fig. 4, *a* is an example of a natural graft in the forest. Inarching is the



(*a*) Natural graft of forest trees; (*b*) inarching of potted plants.

process of grafting two plants or branches, both of which are attached to their own roots. It is used to remedy defects in trees, to propagate potted plants that do not unite easily by other methods, and has been of special value in scientific fruit development. To join the parts it is necessary only to remove a portion of the bark on each plant, bring the wounded surfaces in contact, and then bind stock and cion closely together (Fig. 4, *b*).

The details of a typical process in fruit culture are about as follows: A seedling, which has been left growing long enough to bear about half a dozen leaves, is taken up with the ball of earth clinging to its roots, and transferred to a foster tree. A wound is made

in the surface of each plant by scraping off the outer bark, the two are bound together, and the graft is left to itself to complete the process. In a few weeks, when the nursling has begun to feed upon the larger plant, the soil is removed from the roots of the cion and the roots themselves are trimmed off. Later the top of the stock is also removed, and the nursling receives all of the nourishment from the vigorous roots. The resulting tree grows rapidly and bears fruit much sooner than would have been possible had it been left to nature.

The United States Department of Agriculture at Washington has carried on a long series of experiments in inarching and other forms of grafting, and the results of these investigations, which are of great interest and value, may be secured on application. B.M.W.

An excellent survey of the entire subject may be found in Bailey's *The Nursery Book*. Another simply-written book is Fuller's *Propagation of Plants*.

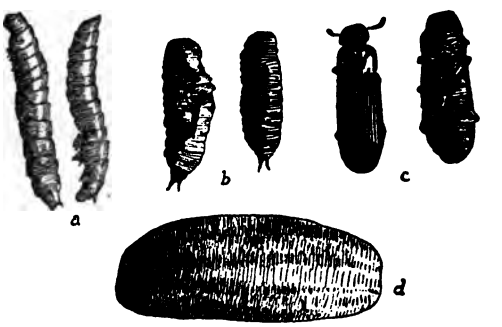
GRAHAM, *gra'am,* GEORGE PERRY (1859-), a Canadian journalist and statesman, one of the most influential members of the Liberal party. He was born at Eganville, Ont., received a high school education, and at the age of twenty-one became editor of the Morrisburg *Herald,* a position he held for twelve years. He was for a brief period associate editor of the Ottawa *Free Press,* and then for fourteen years was managing director of the Brockville *Recorder.*

In the meantime he had entered public life. He was a member of the Ontario legislature from 1898 to 1907, was provincial secretary in the government of Sir George Ross in 1904 and 1905, and in 1907 was chosen to lead the Liberal opposition. He resigned six months later to accept the position of Dominion Minister of Railways and Canals in the Laurier Ministry, and was elected to the House of Commons for Brockville by acclamation. In 1911 he resigned with the Laurier government and was defeated for reëlection, but was elected for Renfrew South in a spectacular bye-election in the following year. Though Sir Wilfrid Laurier still remained the active leader of the Liberal party, much of the detail work was done by Graham, who is particularly effective as a public speaker. After the beginning of the War of the Nations he frequently addressed patriotic gatherings and recruiting meetings. G.H.L.

GRAHAM LAND, a tract of land in the Antarctic region, crossed by the Antarctic Circle, nearly south of Tierra del Fuego. It was discovered in 1832 by Biscoe, captain of an English sealing vessel, who took possession of it for Great Britain. Parts of it are known as Danco Land and King Oscar II Land, the latter section having been discovered in 1894 by a Norwegian named Larsen, who thought that he had discovered a continent. The land is icebound and mountainous. See ANTARCTIC LANDS AND SEAS.

GRAIL, THE HOLY. See HOLY GRAIL.

GRAIN BEETLE, a stout-bodied, chestnut-brown insect, which, together with rice weevils and granary moths, costs the people of North America about $40,000,000 a year, an average of over $100,000 a day. Grain beetles appear



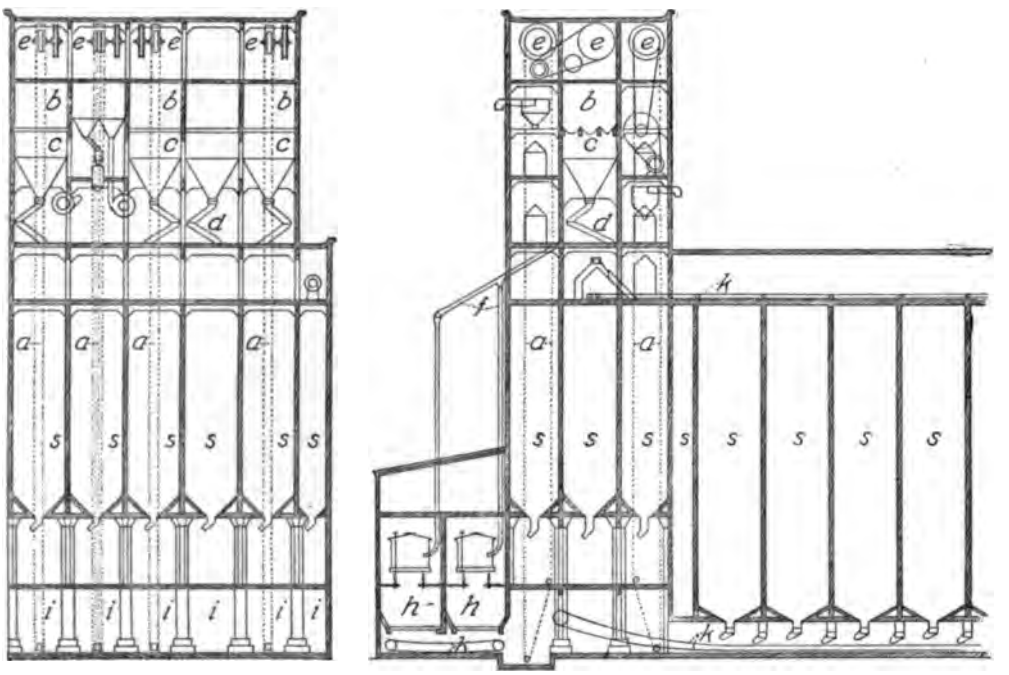
THE GRAIN BEETLE

(*a*) Larvae; (*b*) pupae; (*c*) winged insect. Figure *d* represents a grain of rice, by which figures *a, b, c* may be compared. All the figures are much enlarged.

wherever grain is stored, in every part of the world. They are a source of annoyance to manufacturers of cereals as well as to the consumer who receives a package of breakfast food in which such pests appear. They are about one-seventh of an inch long. A long, snoutlike beak extends from the head and bears the jaws and a pair of feelers (antennae). The female beetle punctures the grain with her snout and lays an egg in the hole. The egg hatches into a tiny white, footless grub, which eats into the grain. Within about forty-one days an egg produces a full-grown beetle, so eggs laid in grain yet in the field would produce beetles in the granary or mill. They in turn, multiply rapidly, especially in dark places. Machinery has been invented whereby, at small cost, grain may be subjected to the action of gases which will kill these pests and leave the grain as pure as it is possible to make foodstuffs.

GRAIN ELEVATOR. This term applies to a building equipped with machinery for loading, unloading, cleaning and storing grain, including the machinery which elevates or lifts

the grain from train or ship to the storage bins. Grain elevators, formerly made of wood, are now often of concrete construction, three stories in height. The top floor of the building, called the *cupola*, contains the loading and unloading machinery and the shafts through which the grain is distributed. The second story contains the garners and storage bins, and on the ground floor are the weighing hoppers and cleaning machinery. Railway cars are unloaded by shoveling the wheat into a pit, from which it is drawn into the elevator by means of a suction shaft, or an endless belt with buckets attached at intervals.



INTERIOR ARRANGEMENT OF A GRAIN ELEVATOR

(*a*) Legs; (*b*) garner; (*c*) scales; (*d*) distributing spouts; (*e*) pulleys; (*f*) car spouts; (*s*) storage bins; (*h*) receiving hoppers; (*i*) motors and other machinery; (*k*) conveyor belts. The illustration at the left is a cross section view from the front of the building; at the right, cross section view from the side.

Elevators for unloading and loading ships are equipped with shafts, or "legs," on the dock side. The hatches of the vessel are removed, the legs are lowered into the hold, the machinery, operated by steam, gas or electric power, is set in motion and the grain is quickly drawn up into the bins. In large elevators 12,000 bushels of grain may be unloaded each hour per leg. As several legs are at work at the same time the speed of unloading is greatly increased. One of the largest elevators in the world stands alongside the docks at Superior, Wis. It has sixteen legs and can load or unload the largest grain-carrying vessel in less than four hours. Loading is simply a reversal of the operations of unloading. Hollow legs communicating with the storage bins are lowered into the hold of the vessel, the bins are opened and the grain pours into the vessel.

There are grain elevators in most English and European towns, but they are not so large nor do they handle such quantities of grain as annually pass through the elevators of Canada and the United States. The elevators of Port Arthur, Canada, as yet the largest in the world, are noted for their speedy loading and unloading of vessels, and yearly handle vastly increasing quantities of grain from Western Canada. See PORT ARTHUR. F.ST.A.

GRAINS, the "breadstuffs" of the world, the seeds of several valuable plants of the grass family. Because Ceres, the Roman goddess of the harvest, presided especially over the growth of the grains, they are commonly known as *cereals*. Since bread is more widely used by civilized man than any other food, the raising of grain constitutes one of the greatest industries in the world. There are six kinds of grain of chief importance; these are wheat, rice, corn, oats, barley and rye, and each has its own

requirements and habits of growth so that it grows best in certain climates and locations. But each grain, wherever it grows in great profusion, is likely to constitute the chief food of the mass of people. Time was, before the world was made comparatively small by railroads and steamship lines, when the people of a wheat-growing region had no rice, and the people of a rice-growing region scarcely knew what corn looked like; and while to-day such conditions have been done away with, the lines of demarcation are still in most cases rather clearly drawn.

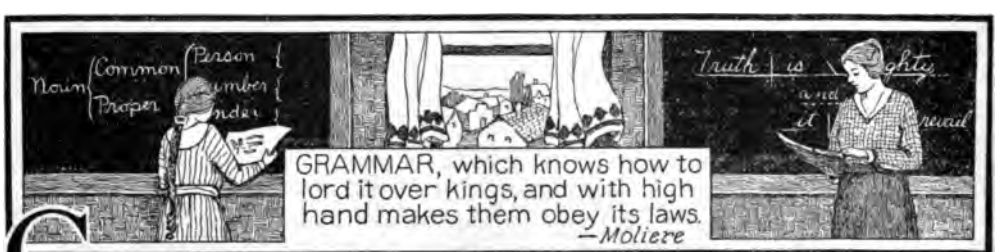
Thus in the United States and Canada, whose wheat-growing possibilities are not surpassed elsewhere in the world, wheat is the staple breadstuff; while in China where wheat cannot be grown easily and cheaply, but where rice thrives in the watery fields, the people subsist almost entirely on rice. Asia might be called the "rice continent," just as America is the "corn and wheat continent," and since the rice regions are those which have been most thickly settled, statistics show that rice forms the chief food of more people than any other grain. Wheat is generally conceded, however, to be the most satisfactory bread material, though some nationalities of Europe use barley or oats or rye, and in the southern parts of the United States Indian corn is a favorite breadstuff. The very name "bread" means different things, according to the country in which it is used. In the Orient it would mean rice cakes; in Germany or Russia, rye bread; in Norway, barley loaves; in Scotland, oaten cakes; in Georgia or Texas, corn "pones," and in England, Canada and most parts of the United States, wheat bread made with yeast.

Under their proper titles in these volumes the various grains are fully treated, and many interesting points are there brought out—what each grain demands for successful growth, where each is most lavishly produced, and what is the relative value of each in the world's crops. These articles also give the food value of the various grains, but for ready reference a comparative table is added here:

Chemical Composition of Grains

GRAIN	WATER	PROTEIN	FAT	TOTAL CARBOHYDRATES	REFUSE AND ASH	FUEL VALUE PER POUND
	Per cent	Per cent	Per cent	Per cent	Per cent	Calories
Barley	11.5	8.5	1.1	77.8	1.1	1,650
Corn	10.3	7.5	4.2	65.9	12.1	1,545
Oats	7.3	16.1	7.2	67.5	1.9	1,860
Rice	12.3	8.0	.3	79.0	.4	1,630
Rye	12.9	6.8	.9	78.7	.7	1,630
Wheat	11.1	13.8	1.9	71.9	1.0	1,675

GRAM, in the metric system of weights and measures, is a measure of weight which is equal in mass to one-thousandth part of a kilogram. A gram is equal to 15.432+ grains, Troy weight, and its weight is the same as that of a cubic centimeter of distilled water at its greatest density, or when it is at the temperature of 39.2° F. The gram is used in weighing light articles and in compounding medicines. See METRIC SYSTEM, for comparative tables of all weights.



GRAMMAR. Every language, in the course of its history, has had many different grammars. The grammar of a language is not a body of dead, dry-as-dust rules; it is the living system of its everyday usages, the customs established by those who are speaking the language. Therefore, since usage is not fixed but is perpetually changing, grammar necessarily changes with it. Shakespeare was not ungrammatical in writing, "This was the

most unkindest cut of all," because in his day the double superlative was still used by the best writers and speakers; but modern grammar brands such expressions as incorrect, reasoning that if the ending *est* conveys the superlative idea, the superlative adverb *most* is not needed. The simplifying spirit of the English tongue has constantly been discarding the superfluous.

English grammar may therefore be defined as the science which teaches the principles of correct English in speaking and writing, according to the standard of the educated people of the time. This covers not only the classes, forms and uses of individual words, but the relations in which they stand to one another when joined in sentences to express thought. The word *grammar* comes from the Greek *gramma,* meaning *letter* or *writing.*

Why We Study Grammar. The chief reason for studying grammar is, therefore, to secure a mastery of "this universal English" of ours, the language spoken by over one hundred fifty million people. In the lower grades, instruction in English takes the form of "language lessons," which merely emphasize what is correct and correct what is wrong, without teaching a system of rules; for grammar is a science, and the minds of little children are as yet too undeveloped to grasp scientific principles. Says Samuel Thurber, an authority on the teaching of English: "The language should be well possessed before it is subjected to scientific study. The youth should not be troubled with grammatical technique till he knows enough to perceive its desirableness." It is not until the seventh grade is reached that the best schools now think it profitable to introduce the study of technical grammar into the course of study.

Up to this time the pupil has been taught to use certain expressions and avoid others without always knowing exactly why. When he comes to the study of formal grammar, he learns the logical reasons for these things. As Dryden says:

> Who climbs the grammar-tree distinctly knows
> Where noun, and verb, and participle grows.

New light is thrown on the work in language, and this developing insight stimulates fresh interest. No longer must the student choose between right and wrong forms on the strength of a memorized model; instead, he applies his knowledge of fundamental rules to straighten out any problem of expression that may arise to puzzle him.

He begins to take real pride in speaking grammatically. The charm of good English begins to make its appeal. He begins to realize that correct speech means the power to express himself clearly and forcefully and will stamp him as a person of education and culture. Gradually he develops the habit of close observation and critical examination, not only of his own speech and that of those about him, but of the English used in the books and magazines he reads. The illustrations in his grammar text—quotations from the masters of modern English—furnish him with the best possible models of sentence structure, raise his standards and arouse his interest in good literature. Incidentally, they give him a certain acquaintance with these writers which makes them seem like old friends when he comes to read their works.

The study of grammar, besides teaching purity of speech and preparing the student for the appreciative study of literature, gives valuable mental training by strengthening the reasoning powers. One must think logically in order to analyze sentences and apply general rules to specific cases, just as one must think logically to analyze and solve problems in arithmetic. This is why grammar ranks second only to mathematics as a "mental discipline" study. Yet it need never be irksome, for a really enthusiastic teacher can make it one of the most fascinating subjects in the course.

Again, both language work and grammar are by their very nature closely correlated with composition, since the student must from the beginning build sentences to illustrate the principles he has been studying. Grammar is likewise a foundation for the study of rhetoric, which is but the science of grammar carried forward into an art. As the Romans used to say, "Grammar speaks; rhetoric gives coloring to speech."

Divisions of the Subject. The majority of modern grammarians recognize only two main divisions of the science—*etymology,* which has been called the "grammar of words," and *syntax,* called the "grammar of sentences." The older textbooks included three others—*orthography,* or spelling; *phonetics,* or pronunciation; *prosody,* or versification—but these are now usually studied as independent branches not properly belonging to grammar.

In the wider use of the word, grammar is *didactic, historical* or *comparative,* according to its treatment. The grammar of our schoolbooks is termed didactic because it lays down

the rules which govern current usage. Historical grammar concerns itself with one language but not with one age, for it deals with all the recorded grammars of the language. Comparative grammar finds resemblances and differences among the various languages belonging to the same general family. Historical and comparative grammar are young sciences which came into being in the nineteenth century with the interest in Sanskrit, the ancient parent from which modern languages have sprung. The present article, of course, covers only the didactic grammar of the English language of to-day.

Parts of Speech. The "grammar of words," or *etymology,* is learned through the mastery of the eight groups into which all words have been divided. These classes are called the *parts of speech,* and comprise noun, pronoun, adjective (including the articles), adverb, verb, preposition, conjunction and interjection. In these volumes each is treated individually and should be looked for under its proper head.

In studying the parts of speech and learning the inflections and uses of each, the student finds it is not a case of "once a verb, always a verb," but that words are one part of speech or another solely according to the part they play in the sentence. The same word may serve in a number of capacities—verbs as nouns; nouns as verbs and adjectives; pronouns as nouns, adjectives and even verbs. Thus, in Whittier's line, "The good is always beautiful, the beautiful is good," both *good* and *beautiful* are used once as noun and once as adjective.

Sentence-Building. *Syntax,* or the "grammar of sentences," has two divisions—*analysis,* which means taking a sentence apart into the elements of which it is composed, and *synthesis,* which means putting together words, phrases and clauses to form a sentence. The sentence is the foundation or unit of all speech, and in English the vital factor in sentence-making is the position or order of the words. In Latin, position is of no grammatical importance; words may be shifted about so as to make harmonious combinations, because it is their inflections that show in what relations the words stand to one another. In the English sentence, on the other hand, although there is a certain amount of freedom in arrangement, a change from the established order usually changes the meaning. For instance, if we transpose subject and object in the sentence, "Wellington defeated Napoleon,"

Outline on Grammar

I. Definition

(1) Deals with classes, forms, uses and relations of words
(2) Science of current usages
(3) Derivation of words

II. Purposes

(1) To teach principles of correct speech
(2) To develop keen observation and criticism of language
(3) To lead up to composition, rhetoric and the study of literature
(4) To cultivate the mind

III. Classification

(1) Ordinary use of term
  (a) Etymology, the "grammar of words"
  (b) Syntax, the "grammar of sentences"
  (c) Orthography, phonetics and prosody no longer included
(2) Broader interpretation
  (a) Didactic
  (b) Historical
  (c) Comparative

IV. Etymology

(1) Parts of speech
  (a) Noun
  (b) Verb
  (c) Pronoun
  (d) Adjective
  (e) Adverb
  (f) Conjunction
  (g) Preposition
  (h) Interjection
(2) Parts of speech a matter of function
(3) Inflections
  (a) Declension
  (b) Conjugation

V. Syntax

(1) Analysis
  (a) Parsing
(2) Synthesis
  (a) Relation to composition
(3) Order of elements of sentence
  (a) Importance in English because of lack of inflections
(4) Kinds of sentences
  (a) Declarative
  (b) Interrogative
  (c) Imperative
  (d) Complex and compound

VI. Present-Day Tendencies

(1) The trend toward simplicity
(2) Dropping gender distinctions
(3) Less frequent use of subjunctives
(4) Short sentences in favor

making it read "Napoleon defeated Wellington," or "Wellington Napoleon defeated," we either change the meaning entirely or leave it a matter of doubt. The study of syntax is therefore essential to teach the relations of words and their proper order for the clear expression of thought.

Beginning with a model of a simple declarative sentence, the student of grammar learns to separate it, first, into its essential subject and essential predicate, and then to analyze in further detail, indicating the object or the complement of the verb, and the various modifiers of subject and predicate. Following the same grammatical principles on which such a sentence was constructed, the student then builds sentences of his own. The next step is the mastery of simple interrogative and imperative sentences—learning the special arrangement and forms that are used to ask questions or give commands. From this point he proceeds to a study of the order which is to be observed in complex and compound sentences, declarative, interrogative and imperative.

Modern Tendencies. The grammar of our language is always tending in the direction of greater simplicity—fewer distinctions and more liberal application of grammatical rules in everyday speech, so as to give greater freedom to colloquial language. "A grammarless tongue," English is often called, and so it seems when compared with German, Latin and the various Romance languages founded upon Latin; for these are all less advanced than English and consequently far more complicated in their grammar.

As explained in the article on gender, distinctive forms for the feminine gender are being employed less and less. The subjunctive mode has almost disappeared from use except in a few common constructions. The long, involved sentences which characterized the older writers have gone out of style, giving way to a large extent to short, crisp sentences, easy to construct and easy to comprehend. It is small wonder, then, in view of its marvelous flexibility and the unequaled simplicity of its grammar, that English is to-day more widely spoken than any other language of a civilized race. L.M.B.

Textbooks on grammar may be secured from any of the schoolbook publishing houses. Consult Tucker's *Introduction to the Natural History of Language.*

Related Subjects. The above article aims to give merely a general treatment of the subject, but the following articles in these volumes give specific information on all the more important phases of grammar:

Adjective	Mode
Adverb	Noun
Article	Parsing
Case	Participle
Climax	Parts of Speech
Comparison	Person
Conjugation	Preposition
Conjunction	Pronoun
Declension	Punctuation
Etymology	Quotation Marks
Gender	Sentence
Infinitive	Syntax
Inflection	Tense
Interjection	Verb

GRAM'PIAN HILLS, a mountain mass in Scotland, extending across the country from southwest to northeast, south of the Caledonian Canal, forming a natural barrier between the Scottish Lowlands and the Highlands. The system, which does not consist of one range, but a series of spurs, covers portions of the shires of Dumbarton, Argyll, Stirling, Perth, Forfar, Kincardine, Aberdeen, Banff and Inverness. The highest peaks are Ben Nevis, the loftiest in the British Isles, 4,406 feet; Ben Macdhui, 4,296 feet; Ben Lomond, Cairngorm and Cairntoul. The hills are crossed by three railways and contain many passes affording views of some of the most romantic scenery in Scotland. From the northern slopes flow the rivers Findhorn, Dee, Don and Spey, and to the southward are the Forth, Tay and Esk, with numerous tributaries. In some parts of the mountains are large deer forests, where the game is carefully preserved for the sport of deerstalking. The mountains are largely of granite formation, and great quantities of the stone are quarried for building purposes. The name *Grampians* is derived from a misreading of Mons Graupius, where the Caledonians were defeated by Agricola in A. D. 84.

GRAM'PUS, a species of dolphin having a spindle-shaped body. Its color is slaty-gray, streaked with white. Several varieties are found in the northern ocean and in the Mediterranean Sea. The common grampus, or cowfish, is sometimes twenty feet long, is slow in its movements and peaceful in its habits. The name is loosely applied to almost any marine animal too large to be called a porpoise and too small to be termed a whale.

GRANADA, *gra nah' da,* formerly a Moorish kingdom in Spain, but now divided into the three modern provinces of Granada, Almeria and Malaga. Its area is 11,128 square miles, which makes it slightly smaller than Maryland

or half the size of Nova Scotia. It is traversed by the Sierra Nevada Mountains, and has fertile plains which are mainly watered by the River Jenil, a tributary of the Guadalquivir. Its principal agricultural products are

LOCATION MAP

The black space in small corner map shows the portion of the entire country that is occupied by Granada.

wine and oil; fruit is also abundant. Its mineral resources are lead, zinc, silver, iron and coal. There are some manufactures of textiles and bricks, and a few oil and flour mills. A railroad connects Almeria with Malaga and Madrid. The region was conquered by the Saracens in 811. In 1238 the Moorish kingdom of Granada was established, but the long Spanish war of Ferdinand and Isabella brought it to an end in 1492 with the capture of Granada. Population in 1910, 503,898.

Granada, a picturesque city whose crooked, narrow streets and quaint houses of Oriental architecture are surmounted by the towers of the Alhambra, an ancient palace of the Moorish kings. It is divided into two parts by the little River Darro, and lies amidst terraced hills covered with luxuriant vegetation, in the northern part of the province of Granada. Although now a "living ruin," it is still filled with remarkable beauty and distinction, for the gilded cupolas rising above each other give an imposing effect to the Moorish architecture. The principal buildings, outside of the Alhambra, are the Generalife, the old royal Moorish summer palace, and the cathedral, richly decorated with marble and statues. In the Royal Chapel of this cathedral are the tombs of Ferdinand and Isabella, who conquered the independent province of Granada in 1492 after a ten years' struggle, and drove the Moors from their last European stronghold.

The city, founded by the Moors in the eighth century, reached the height of its power in the thirteenth century, when it became a renowned center of wealth and learning. During this period its population was over 400,000, but, after surrendering to Spanish rule, the city slowly declined. In 1570 Philip II ordered the remaining Moors deported to inland provinces, and forty years later his successor drove them out of Spain. Although there is a modern section of the city, with a university, founded in 1531, a normal school and a school of fine arts, most of the older part of the city is in a state of decay, and the population is less than 76,000. See ALHAMBRA; MOORS.

GRAN'BY, a town in Shefford County, Quebec, situated in the southern part of the province, on the Tamaska River, fifty-five miles southeast of Montreal and thirty miles north of the United States boundary line. Transportation is provided by the Central Vermont Railroad; an electric line was in course of construction to Montreal in 1916. Granby has a $16,000 postoffice, two colleges, an academy, a convent and a park (twenty acres). The manufacture of rubber goods is the leading industry, more than 700 people being employed in the various plants. Other establishments make tobacco products (these employ 500 people), cigar boxes, rattan goods, furniture, carriages and machinery. Granby was settled in 1800 and was named in honor of Lord Granby, the commander of the British army in the Seven Years' War. It was incorporated as a town in 1855. The population, chiefly French, was 4,750 in 1911; in 1916, estimated by the Census Bureau, 5,000. J.A.T.

GRAND ARMY OF THE REPUBLIC, a patriotic American society whose membership, composed of Northern veteran soldiers, is gradually decreasing as the War of Secession, which was responsible for its founding, recedes into history. It was organized on April 6, 1866, a year after the close of the war, at Decatur, Ill. The purpose of its founders was to strengthen the ties that bound into fellowship the soldiers and sailors who fought to preserve the Union. They sought also to perpetuate the memory of those who sacrificed their lives for the cause, and to give to those who had been left in need by the death of their protectors.

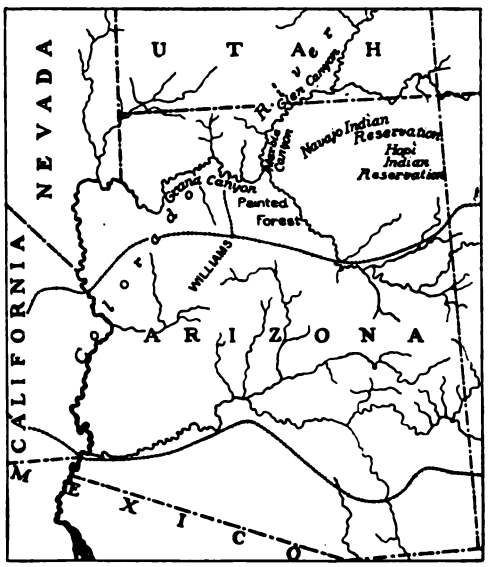
BADGE OF THE G. A. R.

Any soldier or sailor of the United States army, navy or marine corps, who served between April 12, 1861, and April 9, 1865, and was honorably discharged, and members of state regiments who were subject to orders of United States officers, were admitted as members of the society, which grew in numbers until 1890, when the maximum membership of 409,489 was reached. In that year 5,476 veterans died, and the steadily increasing death rate had reduced the membership to fewer than 135,000 at the beginning of 1917.

The Grand Army is divided into local posts and departments representing the states, and annual meetings, known as encampments, are held in the various large cities of the country. On official occasions members wear a dark blue uniform and a slouch hat. Though the Grand Army is in no sense a political organization, it has had a noticeable influence on pension legislation. The society has been especially active in charitable work and in founding soldiers' homes, and to its influence is partly due the custom of observing Decoration Day (which see). The Woman's Relief Corps (which see) is an auxiliary of the Grand Army.

GRAND BANKS, the chief source of the wealth of Newfoundland, are submerged banks of sand, gravel and fragments of rock, stretching 200 miles along the coast of Newfoundland and extending southeast into the Atlantic Ocean for a distance of 500 miles. Their waters range in depth from fifty to 1,000 feet. Thousands of sea birds, circling above them, indicate to the fisherman the location of the shallow waters teeming with fish; codfish, especially, are caught in enormous quantities (see Cod). Over 100,000 Canadian and American fishermen, in *bankers,* crafts especially equipped for fishing in these waters, brave the storms, floating icebergs and dense fogs of the Banks. The heavy fogs are due to the meeting of the Labrador currents and the Gulf Stream. Most of Newfoundland's fishery products, which in 1914 were valued at $7,971,355, are caught on the Grand Banks. See Fish, subtitle *Deep-Sea Fisheries.*

GRAND CAN'YON OF THE COLORADO, one of the greatest scenic marvels in the world. Some discerning travelers under the spell of its splendor do not hesitate to say that it dwarfs all other natural spectacles; E. Burton Holmes, who has probably traveled more extensively than has any other person, calls it "the biggest beautiful thing in the world." Simply stated, this "divine abyss" is the chasm which the Colorado River has cut for itself through the plateau region of Northwestern Arizona (see Colorado River), and is 217½ miles in length. The words *canyon* or *chasm* or *gorge,* all of which are applied to it, give a mental picture of a steep-sided, narrow valley,



LOCATION OF THE GRAND CANYON

on the more or less level floor of which a river flows; but the Grand Canyon admits of no such classification. It is from one to eighteen miles wide, and over a mile deep, and the sandy, turbulent river which twists and winds through its depths is thus buried so far below that scarcely a murmur from it reaches upward to the rim.

To try to describe the Grand Canyon is to attempt the impossible. "When the Creator made it," says one writer, "He made no adjectives to go with it." Even the faintest idea of its stupendous size, its wealth of coloring and its riot of forms, majestic, grotesque or beautiful, can be gained only from actual sight of it. The way to it is from the south, over a level, heavily-wooded plateau, and no hint of the waiting wonders comes to the visitor until he stands upon the southern rim. Across from him, miles distant, but seeming close at hand in the clear atmosphere, is the farther rim, as straight and level as the horizon, while in between and on all hands stretch craggy peaks, flat-topped mesas, steep valleys, terraced rocks, all glowing with the deepest, richest colors. Red, yellow, purple, white, brown and black blend in some spots, and in

others give place to sharply individual tones, the whole presenting a kaleidoscopic effect which no artist can hope to equal, and no writer can hope to describe it.

As for the rock formations—this "sublime city of nature's buildings"—one geologist writes of them:

"If any one of these stupendous creations had been planted upon the plains of Central Europe, it would have influenced modern art as profoundly as Fujiyama has influenced the decorative art of Japan. Yet here are hundreds of them swallowed up in the confusion of multitude."

Curiously like Oriental temples these structures look, with their rich color and their carved lines, and many of them have been christened with this resemblance in mind. There is a Temple of Buddha, a Temple of Isis and a Temple of Zoroaster.

The visitor need not content himself with viewing the canyon from the rim, for two trails, the Hermit and the Bright Angel, give access to the depths. Every turn in their winding discloses new views, and every hour in the day develops its own special beauties of light and shade. To the very bed of the river these trails lead, and the visitor may in four hours reach the depth which it has taken the river countless ages to attain. The visitor who has stayed near the canyon long enough to recover from his first wordless amazement and to form a real impression is likely to speak of it thereafter either in carefully-tempered words or in terms so glowing that to the uninitiated they seem overdrawn. One writer of this latter tendency has been more successful than many others in summing up the true spirit of the canyon:

A labyrinth of huge architectural forms, endlessly varied in design, fretted with ornamental devices, festooned with lacelike webs formed of talus from the upper cliffs, and painted with every color known to the palette in pure transparent tones of marvelous delicacy. Never was picture more harmonious, never flower more exquisitely beautiful. It flashes instant communication of all that architecture and painting and music for a thousand years have striven to express. It is the soul of Michelangelo and of Beethoven. A.MC C.

Consult Dellenbaugh's *A Canyon Voyage;* James's *In and Around the Grand Canyon.*

GRAND FALLS, the county town of Victoria County, New Brunswick, situated in the northwestern part of the province, three miles east of the Maine boundary line and at the head of navigation on the Saint John River, 202 miles from its mouth. Edmundston is thirty-eight miles northwest, and Woodstock is seventy-five miles south. The Canadian Pacific and the National Transcontinental railways serve the town. An abundance of lumber and pulpwood is found in the vicinity, and the industries of the city are largely dependent upon these resources. The beautiful scenery, delightful climate and fine facilities for shooting and hunting have made Grand Falls a favorite pleasure resort. The town was named for the picturesque falls, estimated at 100 feet, which occur in the river at this point; a fine view of the falls may be had from the suspension bridge which spans the river. French, Irish, Scotch and English comprise the greater part of the population. In 1911 it was 1,280; in 1916, estimated, 1,500. D.J.C.

GRANDFATHER'S CLAUSE, The. The fifteenth Amendment to the Constitution of the United States, adopted in 1870, conferred the right to vote upon the recently-emancipated slaves, the vast majority of whom were not fitted for this important duty. After some years of experience, many of the former slaveholding states adopted amendments to their state constitutions enabling them virtually to annul or greatly abridge the provisions of this amendment.

Such amendments provided for a strict registration, with educational tests, such as ability to read and explain any article in the Constitution. That the right of suffrage might be taken from illiterate negroes but not from illiterate white men at the same time, some states provided that the test of illiteracy should not apply to those who had descended from or were the descendants of those who had enlisted as soldiers in any war. This of course only included whites; illiterate negroes would have to pass the educational test, and very few of them could do so. In a few instances it was provided that those entitled to registration should be only those whose ancestors had the right to vote in 1867. All such clauses have received the general name of "grandfather's clause."

GRAND FORKS, a city in the Kettle Valley, British Columbia, in the extreme southern part of the province, about three miles north of the United States boundary. It is at the junction of the forks of the Kettle River, and is on the Canadian Pacific, the Great Northern and the Kettle Valley railways, 418 miles east of Vancouver, ninety-five miles west of Nelson by rail, and twenty-five miles, directly, west of Rossland. Grand Forks is an important railway center, having the roundhouses and machine shops of the Kettle Valley and Cana-

dian Pacific railways. It has the Granby Smelter, the largest copper smelter in the British Empire, and also has iron works, sawmills, nurseries and other establishments. The $60,000 Dominion building and the $40,000 provincial building are conspicuous structures. Kettle Valley, besides minerals and timber, is noted for its rich, loamy soil, and produces fruits, vegetables and grains. Population, in 1911, 1,577; in 1916, about 2,000.

GRAND FORKS, N. D., the second largest city of the state, ranking next to Fargo, and the county seat of Grand Forks County, situated on the eastern border of the state, at the point where the waters of the Red Lake River meet those of the Red River of the North. Fargo is eighty miles south, and Winnipeg, Man., is 163 miles north. The Great Northern and the Northern Pacific railways serve the city, and steamboats ply between this point and Winnipeg. The population, which increased from 12,478 in 1910 to 15,837 in 1916, is largely American, with Scandinavians predominating in the foreign element. Grand Forks was settled in 1871 and incorporated in 1881. It received its name from its location on the forks of the Red and Red Lake rivers. The area of the city exceeds three and one-half square miles.

The Red River Valley, in which Grand Forks is situated, is rich in timber and grain. It is the natural distributing point for North Dakota and Montana, and it manufactures flour, lumber, steam boilers, foundry products and bricks, the annual output of its products amounting to $3,251,075. The shops and division headquarters of the Great Northern and the Northern Pacific railways are here. The trade in live stock, wheat, oats and potatoes is extensive. Grand Forks is the seat of the University of North Dakota, opened in 1884, and of the Grand Forks College, Wesley College and Saint Bernard's Academy. The city has a $185,000 Federal building, a $225,000 courthouse and a Carnegie Library. C.W.G.

GRAND ISLAND, NEB., a distributing point of importance in its territory, and the county seat of Hall County. It is situated southeast of the geographical center of the state and on the Platte River, eighty-five miles west of Lincoln and 127 miles south and west of Omaha. The Union Pacific and Saint Joseph & Grand Island railways and the Burlington Route serve the city. Grand Island was settled in 1857 and was incorporated in 1872. In 1910 the population was 10,326; it had increased to 12,826 in 1916, according to a Federal estimate.

Through its fine shipping facilities the city has become the trade center for a large section in the northwestern part of the state. It has large wholesale houses and transacts an extensive business in live stock, grain and manufactured articles. Beet sugar, candy, canned goods, windmills, brooms and cement block are the leading products. Some of the large machine shops of the Union Pacific Railway are located here. Grand Island has the state soldiers' and sailors' home, Saint Francis Hospital, Grand Island College (Baptist), opened in 1892, and a Carnegie Library.

GRAND JURY. See JURY AND TRIAL BY JURY.

GRAND' MÈRE, *graN mair'*, a town in Champlain County, Quebec, on the right or west bank of the Saint Maurice River, which empties into the Saint Lawrence at the town of Three Rivers, twenty-one miles south of Grand' Mère. Like the neighboring town of Shawenegan Falls, Grand' Mère is a manufacturing center for pulp, paper, doors, sashes and other products of the lumber which is floated down the Saint Maurice. Shirts, boots and stoves are other manufactures. A high school for boys and a Roman Catholic convent are important institutions. Population in 1911, 4,783; in 1916, about 6,000.

GRAND-PRÉ, *grahN pray'*, a beautiful village in Kings County, Nova Scotia, on the Basin of Minas, fifteen miles from Windsor. The French settlers there were expelled in 1713, by order of the English, at the close of what is known as Queen Anne's War (see FRENCH AND INDIAN WARS). It is of this incident that Longfellow tells in his *Evangeline*, though not with historical accuracy. Grand-Pré is immortalized in the following lines:

This is the forest primeval; but where are the hearts that beneath it
Leaped like the roe, when he hears in the woodland the voice of the huntsman?
Where is the thatch-roofed village, the home of Acadian farmers,—
Men whose lives glided on like rivers that water the woodlands,
Darkened by shadows of earth, but reflecting an image of heaven?
Waste are those pleasant farms, and the farmers forever departed!
Scattered like dust and leaves, when the mighty blasts of October
Seize them, and whirl them aloft, and sprinkle them far o'er the ocean.
Naught but tradition remains of the beautiful village of Grand-Pré.

GRAND RAPIDS, MICH., the county seat of Kent County, popularly called the *Furniture City* from the importance of its principal manufacture. It is thirty miles from Lake Michigan, in the southwestern part of the state, and on the Grand River. Lansing and Detroit are respectively sixty and 145 miles southeast, and Chicago is 189 miles southwest. The Grand River descends here eighteen feet in the course of a mile, a circumstance which gave the city its name. Some of the power required by the many industries is furnished by means of a dam. The river is crossed by a number of bridges, some constructed of concrete. Below the rapids, the stream is navigable to the lake, and the city has steamboat connections with Grand Haven, Milwaukee, Chicago and other lake ports. Freight and passenger service is provided by the Pere Marquette, the Michigan Central, the New York Central, the Grand Trunk and the Grand Rapids & Indiana railroads. Interurban electric lines operate to Muskegon and other lake-shore towns, and through Kalamazoo across the state to Detroit. The population, twenty-five per cent of which is Dutch, was 112,571 in 1910; in 1916 it was 128,291, by Federal estimate. The area is about seventeen square miles.

Parks, Streets and Buildings. Grand Rapids is attractively located between low hills in a valley about two miles in width. John Ball, Antoine Campan, Highland and Fullerton Street parks combined contain about 115 acres. These with a number of smaller parks are valued at $350,000. The West Michigan Fair Association owns Comstock Park, which contains 100 acres. Reed's Lake, on the east limits of the city, and North Park, along the river, are popular summer resorts. Canal, Monroe and Division are the main business streets; the better residence section is along the eastern hills.

Prominent among the buildings are the Federal building, erected at a cost of $375,000, a $250,000 courthouse, a $300,000 city hall, the United States courthouse, Masonic Temple, Pythian Temple, Knights of Columbus Hall, Elk Hall, clubhouses for both men's and women's clubs, a $300,000 Y. M. C. A. building, Kent Scientific Museum, the Union Station, Saint Mark's (Episcopal) and Saint Andrew's (Catholic) cathedrals, and a number of fine hotels, banks and churches. The Ryerson Public library contains nearly 100,000 volumes, and is a gift of Martin A. Ryerson of Chicago to his native city.

Institutions. The educational institutions include the Holland Theological Seminary (one of the important schools of the Dutch Reformed parochial system), and several public and private schools and business colleges. Grand Rapids is the seat of Roman Catholic and Protestant Episcopal bishoprics. The benevolent and charitable institutions include the Butterworth Hospital, Woman's Home and Hospital, the Union Benevolent Association Home and Hospital, the City Home for the Treatment of Contagious Diseases, Saint Mary's Hospital, Blodgett House for Children, Emerson Home, Home for the Aged, Holland Union Benevolent Association Home and Saint John's Orphan Asylum. Overlooking the river about one mile north of the city is the Michigan Soldiers' Home; three miles east is the Michigan Masonic Home.

Industries. Grand Rapids is famous all over the world for its furniture-manufacturing industries. In the United States it is outranked in quantity in this industry only by New York and Chicago, in the order named. The annual output exceeds $13,500,000 in value, and in the industry over 10,000 men are employed. Twice a year, in January and July, wholesale buyers from all over the United States and abroad meet in Grand Rapids to see the new furniture and buy their stock. Outside producers exhibit here also, and in the city are several enormous buildings for that specific purpose. From the large wholesale and jobbing houses, groceries, dry goods, millinery, carpets, drugs, crockery, paper, boots and shoes, knit goods, hardware and mill supplies are distributed to Western and Northern Michigan.

The largest manufactories of carpet sweepers and fly paper in the country are located here, and among the other important enterprises are flour and grist mills, machine shops and foundries, bakeries, lumber and planing mills, carriage and wagon factories, and manufactories of show cases, metal belt lacers, button (shoe) machinery, window-sash pulleys, hosiery and knit goods, wood ornaments, tobacco and cigars and clothing. Large gypsum quarries near the city furnish material for the manufacture of gypsum plaster and allied products. The printing industry is also important.

Grand Rapids is centrally located in the great Western Michigan fruit belt and is an important shipping point for fruit, grain and vegetables produced in the surrounding country. Important among the fruits grown are peaches, apples, cherries, plums, pears and

small berries. Chicago, Cincinnati, Saint Louis and even New York buy winter lettuce in Grand Rapids. One very popular variety of winter lettuce which originated here has been given the name of the city.

History. An Ottawa Indian village for many years occupied the present site of the city. A Baptist mission for the Indians was established there in 1824. A trading post and sawmill were built later and the settlement became a town in 1834. It was incorporated as a village in 1838, and chartered as a city in 1850. The commission plan of government became effective in 1917. The waterworks plant is owned by the city. L.H.B.

GRAND REMON'STRANCE, a document presented to Charles I of England by the House of Commons in 1641, setting forth the grievances which they had against him. The outbreak of the Irish rebellion and the rumored intrigues of the king with the Earl of Montrose incited the Puritan party to call him to account. On November 22, while the king was in Scotland, the Commons adopted the Grand Remonstrance by a majority of eleven, after a heated debate. The document enumerated acts of misgovernment extending over the king's entire reign, such as the levying of forced loans and the abuses of the courts of Star Chamber and High Commission.

Charles I ridiculed the Remonstrance and refused to take it seriously. On December 10 he issued a proclamation on religion as an indirect reply, and on December 23 sent an evasive answer to the manifesto. On January 3, 1642, he sent his attorney-general to impeach the five leaders of the Opposition responsible for the Remonstrance before the House of Lords. This act was one of the causes of the civil war in England which resulted in the execution of the king in 1649 and the establishment of the Commonwealth, under Oliver Cromwell. See COMMONWEALTH OF ENGLAND.

GRANGE, *graynj,* the popular name for the Patrons of Husbandry, a secret order in the United States, which was organized in the interests of agriculture but which developed political power because of its numerical strength. In 1866 the government sent O. H. Kelley, of the staff of the Department of Agriculture, to report on agricultural conditions in the South and to devise means of improving them. He found the farmers very poor, backward and discouraged. In December, 1867, he organized the National Grange of Patrons of Industry. The local bodies were called *granges,* and each state had its state grange. In 1873 there were over 10,000 granges in the United States, and in 1875 its membership was 1,500,000, distributed through every state in the Union.

The influence of the grange was potent in reducing railroad rates, abolishing trusts, futures, etc. The most important fruits of the order were the organization of the Department of Agriculture as a Cabinet office, the act for founding experiment stations and the Interstate Commerce Commission. The political element finally took separate shape under the Farmers' Alliance and the Populist Party, after diminishing its own influence by poor management.

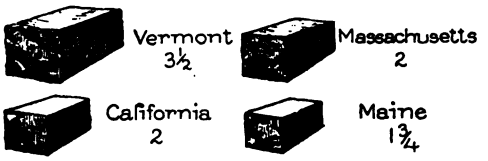
GRANITE, one of the most widely known and popular building stones, is crystallized rock composed of three common minerals, quartz, feldspar and mica, each of which is easily distinguished in the rock. Take a piece of granite and examine it carefully. One part looks like glass; this is the *quartz.* Surrounding the glasslike particles is a substance with a pearly luster; this is the *feldspar.* Scattered all through the rock are flat, shiny crystals that can be split with a knife-blade into very thin pieces; these crystals constitute the *mica.*

We usually think of granite as a gray rock, but it may be of almost any color, from nearly white to black. When both the feldspar and the mica are white, the granite is a light gray. If the mica is black, we have a dark gray. If the feldspar is of any shade of red, we have a red granite. If the feldspar is green, the granite is greenish in tint.

Granite is extensively used in the construction of buildings, for piers of bridges, walls of dams, and wherever great strength and durability are required. It has also almost entirely replaced marble for headstones and monuments. It takes a high polish, and is one of the most beautiful stones used in the arts. It weighs about 167 pounds to the cubic foot and will withstand a pressure of from 5,000 to 20,000 pounds to the square inch without crushing. It is more difficult to quarry and work than limestone or sandstone, but the invention of stone-cutting machinery now makes it available for all purposes. One of Chicago's largest structures, the People's Gas Building, contains eighteen massive granite columns, highly polished, each weighing thirty-one tons and costing $10,000.

Granite is quarried in practically every state crossed by the Appalachian Mountains, and in

California, Colorado, Minnesota, Wisconsin and Wyoming. There are also valuable quarries in British Columbia, Quebec and Nova Scotia. The four leading states in order of production are Vermont, Massachusetts, California and



Figures Represent Millions of Dollars

AVERAGE ANNUAL PRODUCTION OF GRANITE

The comparative value from each of the leading states is given emphasis by means of the graphic illustrations.

Maine. Bunker Hill Monument is built of Quincy, Mass., granite, and the Grant Monument, on Riverside Drive, New York City, is of granite quarried in Wisconsin.

In some varieties hornblende replaces the mica; these varieties are called *syenite* by geologists, but practical stone workers call them granite. The name comes from Syene, Egypt, where the ancient Egyptians quarried this rock for their pyramids, statues and temples. The Scotch granite used for headstones is a Scotch syenite. When the mica forms in layers the granite becomes gneiss.

There are a number of theories concerning the formation of granite, but they all agree that it was formed under great heat and was once in a molten state. When it cooled the minerals crystallized as we now see them in the rock. Granite has been formed at different geologic periods in the world's history, but most of it is considered to be one of the rocks earliest formed. W.F.R.

For comparison of durability of granite and other stone, see BUILDING STONE. The reader is also referred to the following articles in these volumes:

Feldspar	Igneous Rocks
Geology	Mica
Gneiss	Quartz

GRANITE CITY, ILL., an important railroad center, noted also for its extensive granite-ware industry, from which it receives its name. It is situated in Madison County, near the Mississippi River, in the southwestern part of the state, nine miles north of East Saint Louis and eighteen miles south of Alton. Transportation facilities are provided by the Wabash; Chicago & Alton; Cleveland, Cincinnati, Chicago & Saint Louis; Chicago & Eastern Illinois; Chicago, Peoria & Saint Louis; Clover Leaf, and the Illinois Central railways, and by the Merchants' Bridge and Saint Louis terminals. Interurban electric lines connect with cities north, east and south, and a thirty-minute ride on one of these takes passengers from Granite City to the heart of Saint Louis, on the opposite side of the Mississippi. The city was founded in 1894. About one-third of the inhabitants are foreign born; the population increased from 10,000 in 1910 to 15,142 in 1916. The area of the city is nearly four square miles.

In addition to the manufacture of granite ware, the city has extensive steel, lead and corn industries. Madison and Venice adjoin Granite City on the south, and the three are known locally as the Tri-Cities; Venice is situated on the east bank of the Mississippi River, and through it Granite City has additional transportation facilities. The abundant supplies of water and coal in the vicinity increase the manufacturing facilities. Saint Elizabeth's Hospital and a high school building are among the notable structures. Besides public and sectarian schools, the city has a library. J.C.R.

GRANT, FREDERICK DENT (1850-1912), eldest son of Gen. Ulysses S. Grant and himself a soldier before he was thirteen years of age. During the last years of the War of Secession he accompanied his father in nearly all the latter's campaigns, and in 1867 entered West Point Military Academy, from which he was graduated in 1871. He worked as an engineer on the Union Pacific Railway, accompanied General Sherman to Europe for a brief visit, and from 1873 to 1879 was lieutenant-colonel on Sherman's staff in numerous expeditions against the Indians. He resigned from the army in 1881, was United States minister to Austria from 1889 to 1893, and was the police commissioner of New York City for four years.

At the outbreak of the Spanish-American War he was appointed colonel, and soon brigadier-general of volunteers, and saw service in Cuba and the Philippines. In 1901 he was appointed brigadier-general in the regular army and in 1906 major-general. He was at various times in command of the military districts of Southern Luzon, Northern Luzon, the Department of Texas, Department of the Lakes (at Chicago) and Department of the East (New York City). He was in command of this last department at the time of his death.

GRANT, GEORGE MONRO (1835-1902), a Canadian author, clergyman and educator, one of

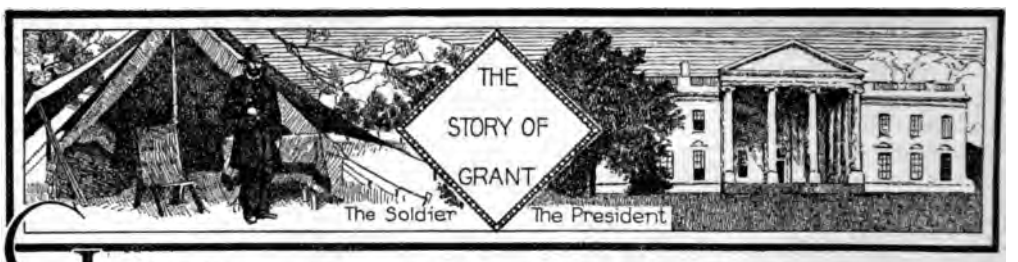
the most brilliant and most versatile men of his time, noted for his eloquence on the political platform no less than in the pulpit. He was for twenty-five years the distinguished principal of Queen's University, which was transformed, under his leadership, from a small denominational college into one of Canada's leading educational institutions. Dr. Grant was born at Albion Mines (now Stellarton), N. S., and attended Pictou Academy, where he took more than his share of prizes and was also known as the best fighter of his age in the school. When he was eighteen he was chosen by the Synod of Nova Scotia as one of four young men who were to be sent to the University of Glasgow to be fitted for the Presbyterian ministry. At Glasgow his career was brilliant; he took highest honors in philosophy and first prizes in the classics, moral philosophy and chemistry. At the same time nothing better testifies to his unique position among his fellow students than that he was president of the Conservative Club, of the Missionary Society and of the Football Club. In addition to these activities he earned his own living, and after four years of college was able to repay to the Synod the money which had been advanced to him when he left Nova Scotia.

GEORGE MONRO GRANT

On the completion of his studies in 1860 he was ordained a minister, and the next year returned to Canada, where the varied interests characteristic of him in boyhood were no less prominent in manhood. After spending two years as a missionary on Prince Edward Island, he was made pastor of Saint Matthew's Church, Halifax, where he remained until he was chosen, in 1877, to the principalship of Queen's. The years at Halifax were busy ones, for in addition to his usual pastoral duties he acted as trustee of Dalhousie University and of the Presbyterian Theological Seminary and served on numerous committees of the church. He was one of those responsible for the union of the four branches of the Presbyterian Church in Canada in 1875. He was an ardent and public advocate of Confederation of the provinces in 1867 and was always interested in political affairs. It was typical of the man, however, that his activity was not confined to his Church or to his party, and every good cause was sure of his support. The converse was also true, that any cause he supported was sure to be a good cause, with the result, as one of his biographers says, that probably "no man in Canada ever succeeded as Dr. Grant did while in Halifax in raising money for various worthy objects connected with education, religion and general benevolence."

From 1877 until his death he held, as principal of Queen's, a conspicuous place in the educational world. A born leader and a splendid worker, he gathered around him an enthusiastic band of helpers, and under him every department of the university developed with great rapidity. As a teacher he was always interesting, probably because he himself was always interested, both in young men and in teaching. In later years he became an ardent Imperialist, and he lost no opportunity to emphasize his opinion that Canada's future was bound up with the British Empire. He wrote many magazine articles and pamphlets, and a few books, including *Ocean to Ocean,* the account of an overland journey from Toronto to British Columbia in 1872; *Our National Objects and Aims; Advantages of Imperial Federation; The Religions of the World; Reformers of the Nineteenth Century;* and *French-Canadian Life and Character.* G.H.L.

GRANT, ROBERT (1852-), an American writer whose *Unleavened Bread,* a "problem" novel of the less unpleasant type, was one of the popular books of its year. Grant was born in Boston and studied at Harvard, receiving his Doctor's degree and graduating in law from that institution. He began to practice law in his native city in 1879, and from the first was successful. In 1888 he was made a water commissioner for Boston, and five years later was appointed judge of the Probate Court and of the Court of Insolvency for Suffolk County, Mass. This post he has held ever since, and since 1895 he has been an overseer of Harvard University. He married in 1883 a daughter of Sir Alexander T. Galt of Montreal. Judge Grant's works include, in addition to the novel mentioned above, *The Undercurrent, The Bachelor's Christmas, The Orchid* and *The Chippendales,* and volumes of essays entitled *The Opinions of a Philosopher* and *The Art of Living.* He has never lived elsewhere than in Boston.



GRANT, ULYSSES SIMPSON (1822-1885), an American soldier and statesman who achieved his great fame as commander-in-chief of the Federal armies during the last year of the War of Secession, when he directed the final campaigns of that terrible struggle. With a singleness of purpose and an unyielding determination that wore out the defense of his gallant opponents, Grant hammered his way to victory and became the savior of the Union. The keynote of his military career is revealed in the message which he sent to Washington from the battlefield of Spottsylvania, where for two weeks, in 1864, the Confederate armies had held Grant's forces in check: "I propose to fight it out on this line, if it takes all summer." In 1868 a grateful people elected him to the highest civil office in the United States, the Presidency, and reëlected him four years later.

Grant was born on April 27, 1822, at Point Pleasant, Clermont County, Ohio. His father, Jesse Grant, was seventh in descent from Matthew Grant, a Scotchman who was one of the original settlers of Dorchester, Mass., in 1630,

HIS BIRTHPLACE

and was one of the founders of Windsor, Conn., in 1635. Noah Grant, grandfather of Ulysses, fought in the Revolutionary War, and at its close migrated first to Pennsylvania and later to Ohio. Jesse Grant, the father of Ulysses, was a tanner by trade, and at one time was in the employ of Owen Brown, the father of John Brown of Osawatomie. In 1822, when Ulysses was born, Jesse Grant was in business for himself at Point Pleasant, but in the next

ULYSSES SIMPSON GRANT
A man who was almost a failure until "he found his work."

year the family removed to Georgetown, about forty miles southeast of Cincinnati. Here Ulysses spent his boyhood, working on his father's farm in summer and attending school in winter. His father, ambitious for his son's advancement, secured for him in 1839 an appointment to West Point, where Ulysses was graduated in 1843.

It was at West Point that Grant adopted the name "Ulysses Simpson." He had been baptized Hiram Ulysses, but was known to his family and friends as Ulysses. The member of Congress who appointed him to the military academy thought that Ulysses was his first name, and that his middle name was probably that of his mother's family, Simpson. The appointment to West Point was therefore made in the name of Ulysses Simpson Grant. The West Point officials were notified of this mis-

take by the new cadet, but they did not feel authorized to correct it. Ulysses Simpson he was on the rolls, and Ulysses Simpson he remained to the end of his days.

At graduation, in 1843, he was appointed second lieutenant and was then assigned to duty at Saint Louis. In the autumn of 1845, with his regiment he joined the army of occupation in Texas, and during the Mexican War took

THE GRANT HOME IN GALENA
Preserved by the city as "Grant Memorial Home," with the aid of an appropriation by the state of Illinois. In it are displayed memorials of the Grant family

part in every important battle except that of Buena Vista. He was brevetted first lieutenant for conspicuous services at Molino del Rey, and was brevetted captain for bravery at the storming of Chapultepec (see BREVET). For several years after the close of the war he was assigned to garrison duty in various parts of the United States. In the meantime, August 28, 1848, he had married Miss Julia Dent, the sister of a West Point classmate, but when he was detailed to duty in California his wife and children remained in Saint Louis. Two years of separation from his family and the seemingly endless prospect of garrison life led him to resign his commission on July 31, 1854.

Returning to Saint Louis, Grant settled with his family on a sixty-acre tract which his father-in-law set aside for them. Here, for nearly four years, Grant lived the life of a farmer. With his own hands he built a log cabin, which he called "Hardscrabble." He cleared the land, plowed and hoed, hauled wood to the mines, and worked hard all the time. But his efforts met with little success, and in May, 1860, he took his family to Galena, Ill., where he became clerk in a leather and hardware store owned by his father. He was thus employed when the War of Secession broke out—the event which so completely changed his prospects.

It is the truth, and no reflection on his abilities as proved at a later time, that in 1861 Grant was regarded by his family and friends as a broken man. He was nearly forty years old, he had tried first one occupation and then another, and had been successful in none. His army career had started well enough, but apparently wasted into nothing. As a farmer he had barely been able to make a living on land which cost him nothing, and some real estate dealings by which he hoped to improve his financial affairs turned out badly. In 1861 his younger brother, who managed the Galena store, felt that the services of the future President were worth only $15 a week.

His Great Military Service

In the War of Secession. Immediately after the commencement of hostilities he offered his services to the national government, but received no reply to his letter. Meanwhile, he was acting as mustering officer of the Illinois volunteers, and in June was chosen colonel of the Twenty-first Illinois regiment of infantry. After several months he was made brigadier-general of volunteers and was given command of the district of Southeastern Missouri, with headquarters at Cape Girardeau. Learning that Confederate forces were about to seize Paducah, Ky., at the junction of the Tennessee and Ohio rivers, he occupied the city on his own initiative, and thus prevented the enemy from gaining a foothold in Western Kentucky. His first battle as a commander was at Belmont, Mo., where he showed himself a capable leader, though he achieved no material advantage. Early in 1862 he saw the strategic importance of Fort Henry and Fort Donelson (which see), and after much pleading for permission was allowed to undertake the campaign which ended with the capture of those forts. His reward was promotion to the rank of major-general of volunteers. It was at Fort Donelson that Grant won his nickname, "Unconditional Surrender." When General Buckner, in command of the Confederate forces, asked that commissioners be appointed to arrange terms for surrender, Grant replied: "No terms other than unconditional and immediate surrender can be accepted. I propose to move immediately upon your works." The

public appreciated its own little joke, and Grant's initials, "U. S.," were said to stand for "unconditional surrender."

Although Grant was now famous, he was soon in difficulty. About this time he quarreled with General Halleck, his chief, and was virtually placed under arrest. He was allowed to keep his command, however, and at the Battle of Shiloh just managed to save his army from annihilation. At Shiloh Grant displayed great bravery, but did not seem quite equal to all emergencies. At any rate Halleck thought so, and made Grant second in command of the combined armies of the Tennessee and the Ohio, a nominal command which had no important duties and which the army regarded as indicating that Grant was in disgrace. Grant's fortunes were to sink but one step lower, with the collapse of the first campaign against Vicksburg, before they turned. The defeats before Vicksburg in December, 1862, were relatively unimportant, but they led many well-intentioned persons to believe that Grant was unfitted for command. There were rumors, too, that he was frequently intoxicated, and there is little doubt that he would have been forced into retirement had it not been for Lincoln's firm support. Lincoln seems to have recognized Grant's ability at an early date, and deliberately disregarded all rumors, true or false, about him. On one famous occasion, when a committee called on him to demand Grant's removal for intoxication, Lincoln jokingly asked the critics to find out what brand was Grant's favorite, so that kegs of it might be sent to the other Union generals.

Lincoln's faith in Grant was finally vindicated by the successful end of the Vicksburg campaign. After the surrender of the forts on July 4, 1863, Grant was made a major-general in the regular army, and several months later took command of a great army at Chattanooga. In the battles around Chattanooga, in November, 1863, he destroyed the foothold of the Confederacy in the center and west. It remained only to destroy its power in the east. To this end Grant was made commander-in-chief, with the rank of lieutenant-general of all the Federal armies in the field, and himself took command of the Army of the Potomac. From this time to the end, the war in the east was a series of almost continuous battles. Grant never relaxed his hold, and in spite of occasional checks and partial defeats, pursued his policy of wearing his opponents down. His relentless campaign for Richmond, though carried on with a sacrifice of life which would have sickened and disheartened a less determined commander, had its inevitable result in the surrender of the heroic Lee at Appomattox Court House, on April 9, 1865.

His Fame as a Soldier. Grant was a great commander, and few commanders of any country are his peers. Yet it is not fair to say that Grant was a great soldier born. Personally courageous and daring almost to a fault he was, but he learned the art of campaigning in the bitter school of experience. The buoyant, energetic Grant who fought at Shiloh was not the same grim figure which led the way from Vicksburg to Appomattox. After all, it is immaterial whether Grant originally possessed the needed qualities or whether he acquired them, but the fact is that he did have the energy, the judgment and singleness of purpose to carry his task to its conclusion. McClellan had greater *finesse*, Rosecrans was more brilliant and Buell was more exact and careful, but none of these Federal generals seemed to combine these qualities in the right proportions.

Peace and Politics. After the death of Lincoln, President Johnson and others in authority showed a disposition to treat the Confederate leaders with severity. Indictments for treason were brought against Lee and several others, in absolute disregard of the terms of surrender. Grant protested against this breach of faith, and even threatened to resign from the army if the President did not heed his protest. In 1866 Grant was promoted to the rank of general, a grade higher than any other American soldier, not excepting Washington, had held before him. In 1867, after President Johnson had suspended Secretary of War Stanton, Grant was appointed to succeed him, but he was only too glad to resign when the Senate refused to confirm the President's action. His eagerness to keep out of the controversy between Congress and the President led to bitter feeling between him and Johnson, and brought Grant into politics in spite of himself.

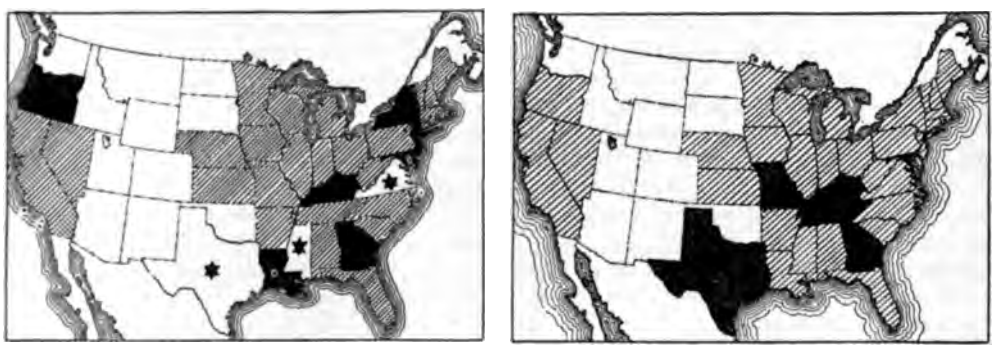
Grant had never taken any interest in politics; in fact, he had only voted at one Presidential election, that of 1856, when he cast his ballot for Buchanan. In 1868, politically considered, he was an unknown quantity. A number of leading Democrats even approached him with a proposal to make him the Democratic nominee for President, but the effect of his quarrel with Johnson had been to bring him

into closer touch with the Republicans in Congress. He was, moreover, in general accord with the Republicans on the tariff, the national banking system and internal improvements. He was unanimously nominated by the Republican convention on the first ballot, and was elected by the large majority of 214 electoral votes to eighty for Horatio Seymour, the Democratic candidate. (See map below, for party division of states.)

Grant, the President

His Administration (1869-1877). When Grant took office as the eighteenth President, he fell heir to a reconstruction policy only partly carried out (see RECONSTRUCTION). The Fifteenth Amendment to the Constitution, which guaranteed the right of suffrage without regard to "race, color or previous condition of servitude," was passed by Congress before Grant became President. It had his active support, however, from the beginning. and when it was ratified and declared in force, March 30, 1870, he declared that it was "a measure of grander importance than any other one act of the kind from the foundation of the government to the present day." Meanwhile, reconstruction was not proceeding satisfactorily, and conflicts between the negroes and their late masters became so frequent and violent that Congress, at the President's request, passed the Force Acts, which authorized the President to suspend the writ of *habeas corpus* in any district and to declare martial law. When repeated warnings did not bring about the desired results, Grant used these extraordinary powers in parts of North and South Carolina, and even instituted prosecutions against several prominent offenders, with the result that a measure of quiet was restored.

The President also intervened in a number of contested elections in the South and sent Federal troops to support the Republican candidate. In these instances many people felt that the President had acted with unnecessary harshness. In May, 1872, the reconstruction policy, so odious to the South, was modified by the passage of the Amnesty Act, restoring civil rights to all but about 300 persons in the South; this marked the beginning of the end of "carpet-bag" rule (see CARPETBAGGERS).



1868 GRANT'S TWO ELECTIONS 1872

The shaded states are those that gave their electoral votes to Grant; the black-colored states supported the Democratic ticket; the white areas represent non-voting territories. In the election of 1868 Virginia, Mississippi and Texas (starred on the above map) did not participate in the Presidential election, for until 1870 they did not comply with Federal requirements which had been imposed upon the states of the former Confederacy.

Vigorous Foreign Policy. During the election campaign Grant had given little indication of the policies he would pursue if elected, but he had the confidence of the public, which was increased by the speedy negotiation of the Treaty of Washington and the settlement of the Alabama Claims (see WASHINGTON, *Treaty of;* ALABAMA, *The*). In one respect, however, the President's policy failed to meet general approval. In 1869 the government of Santo Domingo sought annexation to the United States. Grant was heartily in favor of this step, and tried for several years to bring it about, but the United States Senate finally refused to approve the treaty of annexation. In another West Indian island, Cuba, an insurrection had been going on for several years, and American citizens and ships in Cuban territory had occasionally been detained by the Spanish authorities on the pretense that they were aiding the insurgents. The climax of

these seizures was the Virginius Massacre (which see), which created intense excitement in the United States and almost led to war. Grant, however, by acting with firmness and promptness, won from Spain a complete apology and full reparation for the outrage.

Election of 1872. Chiefly as the result of the administration's policy toward the South, a considerable faction in the Republican party felt that Grant's reëlection would be a calamity. This faction, led by Charles Francis Adams, Carl Schurz, Charles Sumner and Horace Greeley, organized the Liberal Republican party at a convention in Cincinnati in May, 1872. The original intention was to nominate Adams for President, but the convention was stampeded for Greeley, who was still unpopular in the North for his act in signing Jefferson Davis' bail bond. The Democrats accepted Greeley as their candidate, while the Republicans renominated Grant. Grant was elected by a popular vote of 3,597,000 to 2,834,000 for Greeley. Grant received 286 electoral votes to 63 votes for Thomas A. Hendricks, B. Gratz Brown and the other candidates, Greeley having died before the electoral college met (see GREELEY, HORACE).

Financial Legislation and the Panic of 1873. Early in 1873 Congress passed a coinage act which received little attention at the time. At that time neither gold nor silver was in circulation, the government had not resumed specie payments, and the only currency was bank notes and "greenbacks." This act dropped the silver dollar from the list of standard coins, a procedure which was denounced a few years later as the "crime of 1873." When the act was passed no silver dollars had been coined for twenty years, and it was not until later, when the free silver agitation swept the country (1896), that great political capital was made of the act of '73.

Another noted fiscal law of 1873 is known in history as the "salary grab." The act raised the salary of the President from $25,000 to $50,000, and increased the salaries of all Federal judges and of members of Congress, including the members of the Congress which passed the bill. This last feature was violently opposed by the public, which expressed its indignation so forcibly that so much of the act as related to Congressmen's salaries was repealed.

The "salary grab" was merely an incident in a time of riotous wastefulness which could have but one end. Overproduction, overtrading and overexpansion of credit led to one failure after another among the banking houses of New York, until the country was seized with panic. Credit was refused, savings banks suspended payment, factories shut down and their owners were driven into bankruptcy, and many of the railroads were forced into the hands of receivers. To relieve the money stringency Congress passed the so-called Inflation Bill, providing $100,000,000 in inconvertible paper currency. Grant vetoed the bill, a courageous act for which the country owes him a great debt, and largely through his efforts and those of John Sherman, then Senator from Ohio, Congress passed an act for the resumption of specie payments (see SPECIE PAYMENTS, *Resumption of*).

Scandal and Corruption. For nearly half a century the United States had seen more or less corruption in high places, but Grant's administration seems to have been fixed by some evil genius as the time for the worst disclosures. Unfortunately for Grant's reputation, both then and now, his praiseworthy actions were sometimes overshadowed by the faults of his subordinates. One of Grant's most lovable traits was a simple trust in his friends; he found it impossible to think evil of any man to whom he had given his friendship. It was his misfortune that some of his friends took an ignoble advantage of his trust. The affair of the Credit Mobilier, the Whisky Ring and the Star Route Frauds, although these last were not exposed until the Hayes administration, were but typical of the existing laxness of morals (see CREDIT MOBILIER; STAR ROUTE FRAUDS). In New York City the Tweed ring was finally broken up in 1871, but in 1876 Grant's Secretary of War, W. W. Belknap, resigned to avoid impeachment for selling contracts for army supplies. Fraud was discovered in the customs service and in the Indian Bureau. Grant had made at least one attempt to reform the government service; he had secured the Civil Service Act of 1871, but two years later Congress blocked further reform by refusing to appropriate funds.

Other Items of Interest. One of the most noteworthy features of Grant's term was the sudden rise of the "Grangers," or "Patrons of Husbandry" (see GRANGE). Equally interesting was the first appearance, in 1876, of a national Prohibition party. In 1873 Congress passed a law ordering the issue of the first one-cent postal cards, and in 1876 admitted Colorado to the Union. The year 1876 also

OUTLINE AND QUESTIONS ON U. S. GRANT

Outline

I. Years of Preparation

(1) Birth and ancestry
(2) Education
(3) Service in Mexican War
(4) Unsuccessful attempts at farming and at real-estate dealings

II. War of Secession

(1) Early activities
(2) "Unconditional Surrender"
(3) Ebb of his fortunes
(4) The Vicksburg campaign
(5) Campaign for Richmond

III. His Administration—1869-1877

(1) Reconstruction
  (a) Fifteenth Amendment
  (b) Force Acts
  (c) Suppression of Ku-Klux Klan
  (d) Intervention in local elections
(2) Important legislation
  (a) Civil Service Act, 1871
  (b) Coinage Act, 1873
  (c) Inflation Bill
  (d) Resumption Act of 1875
(3) Political corruption and financial disorders
  (a) Credit Mobilier
  (b) Whisky Ring
  (c) "Salary Grab" Act
  (d) Tweed Ring
  (e) Panic of 1873
(4) Foreign affairs
  (a) Treaty of Washington
  (b) Alabama Claims settled
  (c) Virginius Massacre
  (d) Attempted annexation of Santo Domingo
(5) Other important events
  (a) Election of 1872
  (b) Election of 1876
  (c) Indian risings
  (d) Chicago and Boston fires
  (e) Bell telephone patented
  (f) Union Pacific Railway completed
  (g) Centennial Exposition

IV. Later Events

(1) Trip around the world
(2) Business losses
(3) *Memoirs*
(4) Death

Questions

Give the origin of Grant's popular nickname.

How much larger was Grant's salary in 1871 than it had been ten years earlier?

What was the Ku-Klux Klan, and how did the administration deal with it?

What is there in the last years of Grant which reminds you of the last years of Sir Walter Scott?

What interesting fact shows Grant's complete lack of interest in politics?

Name two extremely important inventions which were brought before the public during this administration.

Why was Grant without a commission at the outbreak of the War of Secession?

When and why did he threaten to resign from the army?

When did Grant's firmness prevent a possible break with a country with which the United States did go to war twenty-five years later?

In what way would it have been better if Grant had not had such implicit faith in his friends?

What was Grant's real name and why was he not known by it?

What was the "salary grab," and how was it changed because of public disapproval?

What famous saying of Grant shows the dominant trait in his character?

To whom did he owe his continuance in the army despite various failures?

In what way did his early life differ from that of Lincoln or of Garfield?

What was the chief significance of the battles around Chattanooga?

Mention one instance in which Grant used his veto power with good effect.

marked the completion of the first century of American independence, and was fittingly celebrated by a great Centennial Exposition (which see) at Philadelphia. Two of the exhibits there were recent inventions, then still regarded as of little practical value—one was the incandescent electric light, the other was the Bell telephone.

During the eight years of Grant's Presidency the United States was at peace with the rest of the world, but within its own borders there was savage warfare. In 1871 and 1872 the Apache Indians in Arizona and the Modoc Indians in California were on the warpath, and

TOMB ON RIVERSIDE DRIVE

It faces south, with the Hudson River many feet below, at the left. In an open circular vault a dozen feet below the marble floor of the main room, over which a purplish light is diffused, lie side by side the President-General and his wife, Julia Dent Grant. In small adjoining rooms are preserved mementos of the period of the War of Secession. The building was constructed of Wisconsin stone, quarried at Montello.

in 1876 the Sioux Indians, led by Sitting Bull, massacred gallant General Custer and his entire force in Dakota Territory (see CUSTER, GEORGE A.). The Chicago Fire of 1871 and the Boston Fire of 1872 were disasters of a different kind. During the closing months of Grant's term the great issue before the people was the contested election, full details of which are given in the article on Rutherford B. Hayes.

Around the World and Home Again. In May, 1877, just two months after the inauguration of his successor, Grant started on a trip around the world in company with his wife and eldest son, Frederick. He sailed from Philadelphia to Liverpool, and visited the British Isles and the great cities of continental Europe. From Marseilles he went to Egypt and the Holy Land, thence to India, China and Japan, and finally back to America at San Francisco, where he landed in September, 1879. Everywhere he was enthusiastically received, not merely as the ex-President of the United States, but as one of the greatest soldiers of modern times.

In 1880 a determined attempt was made to nominate Grant for a third term, but he himself took no part in the campaign. Soon afterward he removed from his old home at Galena, Illinois, to New York, where he invested all his capital in the banking firm of Grant & Ward, of which his son was a partner. The mismanagement of the junior partners brought the firm to bankruptcy, and left the General, then sixty-two years old, penniless. To help support himself he wrote a series of magazine articles on his principal campaigns. These were so successful that they led several publishers to make handsome offers for his personal memoirs, the story of his life to the end of the War of Secession. When he realized that he was suffering from cancer he redoubled his efforts to finish the book, and the last word was written only four days before his death, which occurred on Mount McGregor, near Saratoga, N. Y., on July 23, 1885. His body now lies in a great tomb on Riverside Drive, New York City; this tomb was paid for by popular subscription, and was dedicated by President McKinley on April 27, 1897. W.F.Z.

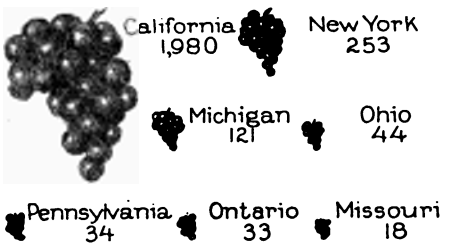
Consult Nicolay's *The Boys' Life of Ulysses S. Grant;* Hosmer's *The Outcome of the Civil War;* Garland's *Grant: His Life and Character.*

GRANULATION, *gran u la'shun,* a healing process occurring in open wounds. The granulation consists of small pebbly masses of fleshy matter which grow over the wound and assist in the gradual closing and healing. Sometimes the granulations are forced upward, beyond the surface of the wound. Such growth is commonly known as proud flesh, and differs greatly from the healthy granulations. Proud flesh is usually removed by the surgeon's knife or treated with strong caustics.

The term *granulation* is sometimes applied to lumps or sores appearing on the inner portions of the eyelids and on the eyeball itself. The scientific name for the disease in which these symptoms occur is *granular conjunctivitis,* but it is more commonly referred to as granular eyelids. One form of granular con-

junctivitis is the very contagious disease known as trachoma. Granular eyelids may be easily spread by carelessness in regard to towels and other toilet requisites. Anyone suffering from this malady should see that no other member of the family uses the same articles of toilet that he does. W.A.E.

GRAPE, the fruit of the vine, probably the first fruit cultivated by man. It was known to the Egyptians at least three thousand years ago,



GRAPES GROWN IN A YEAR

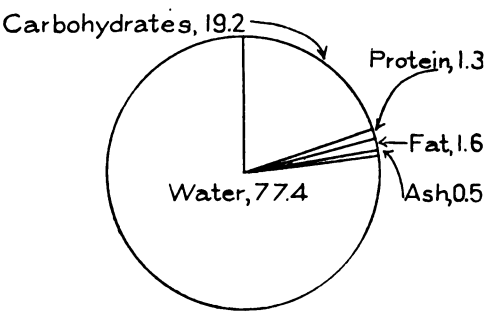
The average crop in seven leading centers of production.

and among the ancient Greeks and Romans its use was common. From the days of earliest history the vine has been a favorite plant, not only on account of its delicious fruit and the wine it yields but because of the grateful shade afforded by its climbing stems and large leaves. In the Bible we read that the Israelites dwelt in safety, each under his "vine and fig tree" (*I Kings* IV, 25), and how Pharaoh's cupbearer dreamed a dream concerning a vine (*Genesis* LX, 9-11). At the present day the grape is one of the most important of food fruits; it appears almost daily in some form in the diet of nearly all countries of the world. The earliest cultivated species was derived from the wild grape found on the eastern coasts of the Mediterranean Sea and in the neighborhood of the Caspian Sea. The varieties now cultivated number many hundreds.

Methods of Culture. The grape is a climbing plant, with large, three-lobed leaves, and clings to every available support by means of tendrils. The wild grape is propagated by seeds, but the usual method of culture is by taking cuttings or layers from established vines. Cuttings are usually taken from the winter trimmings of the vine and are planted in the early spring in well-worked and fertilized ground. When the cuttings have reached the age of two years they are transplanted to the vineyard or wherever it is decided to place them. Layers are taken by bending a shoot of a growing vine down to the ground and covering two or three joints or "eyes" with earth. Roots then sprout downward and shoots grow upward from each eye. These may be separated from the buried branch and transplanted. Few if any plants require less care than grapevines, but on the other hand none responds more readily and bountifully to good treatment.

Care must be taken to prevent the young vine from overburdening itself, for one that bears too heavily at first may become permanently weakened. The first season after transplanting the vine should not bear any fruit at all; from three to six clusters, according to its size and vigor, is sufficient for the second season; the third year it should produce about ten pounds of grapes, and the fourth, double that number. Twenty pounds per vine is considered an average crop, but it is recorded of a famous Concord vine that it bore each year at least ten bushels. Such a yield is, of course, exceptional. Grapes bring varying prices, according to quality, variety, season, etc. Choice California grapes cost from thirty to forty cents a pound in the winter. The popular Concord grape may be purchased in the summer season for about twenty-five cents a basket.

One of the secrets of successful grape culture is to make sure that the grapes are grown on shoots of that season's growth. At the beginning of every winter all branches and shoots must be cut back to from two to five buds. A vineyard in winter appears like a barren waste of land almost covered with stumps.



COMPOSITION OF GRAPES

Figures indicate percentages. The heat-producing value of grapes is 435 calories per pound, therefore about equal to very lean round steak, brook trout, green corn and boiled potatoes. Their fuel value is thus seen to be not high.

Vines need good, well-drained, warm soil and a climate that is free from early fall and late spring frosts. European vines, grown in the open, stand alone, but the American varieties need supports. The shoots are usually either

tied to, or trained over, wires. The grape cuttings introduced from Europe into America have proved successful on the Pacific coast. The grapes grown in the Eastern and Central states are of native origin, the result of careful selection and training.

BLACK ROT

A cluster of Niagara grapes of which half have black rot. Some of those affected have dried down to mummies.

Enemies of Grapes. The most dangerous enemy of the vine is the animal parasite called *phylloxera,* whose attacks caused great destruction among the vineyards of Europe year after year. It appeared in England in 1863 and in France a little later. It was soon discovered that American vines were able to resist this parasite, and now most of the vineyards of Europe contain vines grafted with American stock (see PHYLLOXERA).

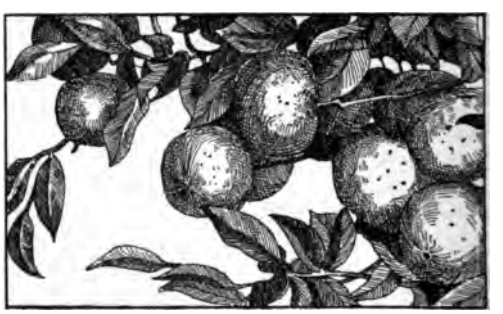
The two most common diseases of the grape grown in the United States and Canada are *downy mildew* and *black rot.* The downy mildew is caused by a fungus growth and appears on the leaves and fruit in the form of purplish stains, the stained parts quickly rotting and affecting the whole vine. Black rot attacks the leaves, dark brown stains appearing as the first signs. From the leaves the disease spreads to the fruit, which turns black, withers and dies. For these and all similar diseases the best prevention is thorough spraying of the vine with Bordeaux mixture.

Uses of the Grape. The first use of grapes was naturally as a fresh fruit, the flavor and nourishing qualities, due to the large quantity of sugar contained, rendering them superior to other fruits known in olden days. Then came the juice of the grape, drunk directly as squeezed from the fruit, or after it had been fermented and turned into wine. Dried grapes, or raisins, early became a staple article of food and among the Greeks the grapes of Corinth, now called *currants,* formed practically the only food of the athletes. In modern households raisins and currants appear daily in cakes, puddings, pies, jams and jellies; and grape juice, a refreshing, nourishing drink made of the unfermented juice of the fruit, is highly esteemed throughout the world.

Grapevines as Decorations. The grapevine, properly trained, affords perfect shade, and is able to transform the most bare and unsightly buildings into things of beauty. In all towns and villages there are houses on which the sun shines from the east, west and south, blistering paint and in summer rendering them almost uninhabitable. Grapevines would turn the sunshine into fruit and foliage, save money and materially add to the health of the home. Arbors and pergolas draped with vines add to the beauty of parks and gardens, and, with little care and outlay, the grape will turn dreary places into beauty spots. F.ST.A.

Consult *Farmer's Bulletin 30,* United States Department of Agriculture, "Grape Diseases;" Duggar's *Fungous Diseases of Plants.*

GRAPE'FRUIT, a citrus fruit, allied to the lemon and orange, and called *grapefruit* because the fruit grows in clusters like bunches of grapes. The tree grows to a height of from twenty-five to thirty feet; the fruit is

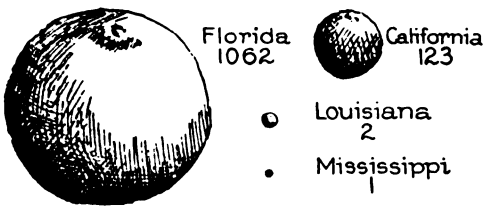


HOW GRAPEFRUIT GROWS

four to seven inches in diameter and weighs from one to twelve pounds. The pulp resembles that of the orange, except that it is coarser, and the juice is sour and a little bitter. Its acidity has been greatly reduced by grafting and crossbreeding. It is usually eaten with sugar, although some people prefer it without.

It became popular as a breakfast fruit practically since 1900, and the increased demand has led to extensive growth. It sharpens the appetite, which is its real food value. The pomelo variety is now grown to the extent of over 1,190,000 boxes annually in Florida and California, with an annual value of over $2,000,000 to the growers. About ninety per cent are produced in Florida, and ten per cent in California.

The grapefruit originated in the Malayan and Polynesian islands. It has been extensively cultivated in India, Florida and California, and in most tropical and subtropical countries. The round-fruited sorts are called



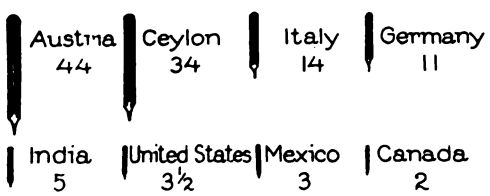
Figures Represent Thousands of Boxes

PRODUCTION CHART

Average yield each year, as reported by the United States Census Bureau.

pomelos, or grapefruit, and are the most valuable commercially. The pear-shaped fruits are called *shaddocks,* after Captain Shaddock, who found them in the East Indies and introduced them into England in 1810. The shaddock is so acid that it is not edible; it is cultivated more as a curiosity and is seldom found in the markets. The natives in the West Indies and other regions use the juice of the shaddock for scrubbing floors, because it drives away insects. S.L.A.

GRAPHITE, *graf'ite,* the mineral used for the "lead" in lead pencils. It is of an iron black or dark gray color, has a luster, and is found in masses which are composed of minute scales crowded together. It is very soft and brittle



Figures Represent Thousands of Tons

PRODUCTION CHART

Comparing lead pencils of different sizes we indicate clearly the annual production of graphite from the principal countries. In addition to the countries named, Chosen (Korea) mines an unknown quantity, of which the United States imported 6,327 tons in 1915.

and is easily reduced to a fine powder, though the grains are very hard. It has a soapy touch, but will leave its mark on almost any substance it touches; this characteristic makes it valuable for pencils.

Graphite is found in pockets in the older crystalline rocks. It was formed from plants in the same manner as coal, though with the graphite the process was carried further. Next to the diamond, graphite is the purest form of carbon. Here we find one of the wonders of nature—the brilliant, sparkling diamond, the hardest known substance, and the black, crumbling, greasy graphite, the softest known mineral ore, are merely different forms of the chemical element, carbon. Graphite is mined and prepared for the market by grinding and then purifying in settling tanks. Its chief uses are in the manufacture of lead pencils, for lubricating machinery and for making crucibles. For the last purpose it is mixed with clay, which fuses with the graphite and forms a crucible that will not melt under the most intense heat. See PENCIL; CARBON.

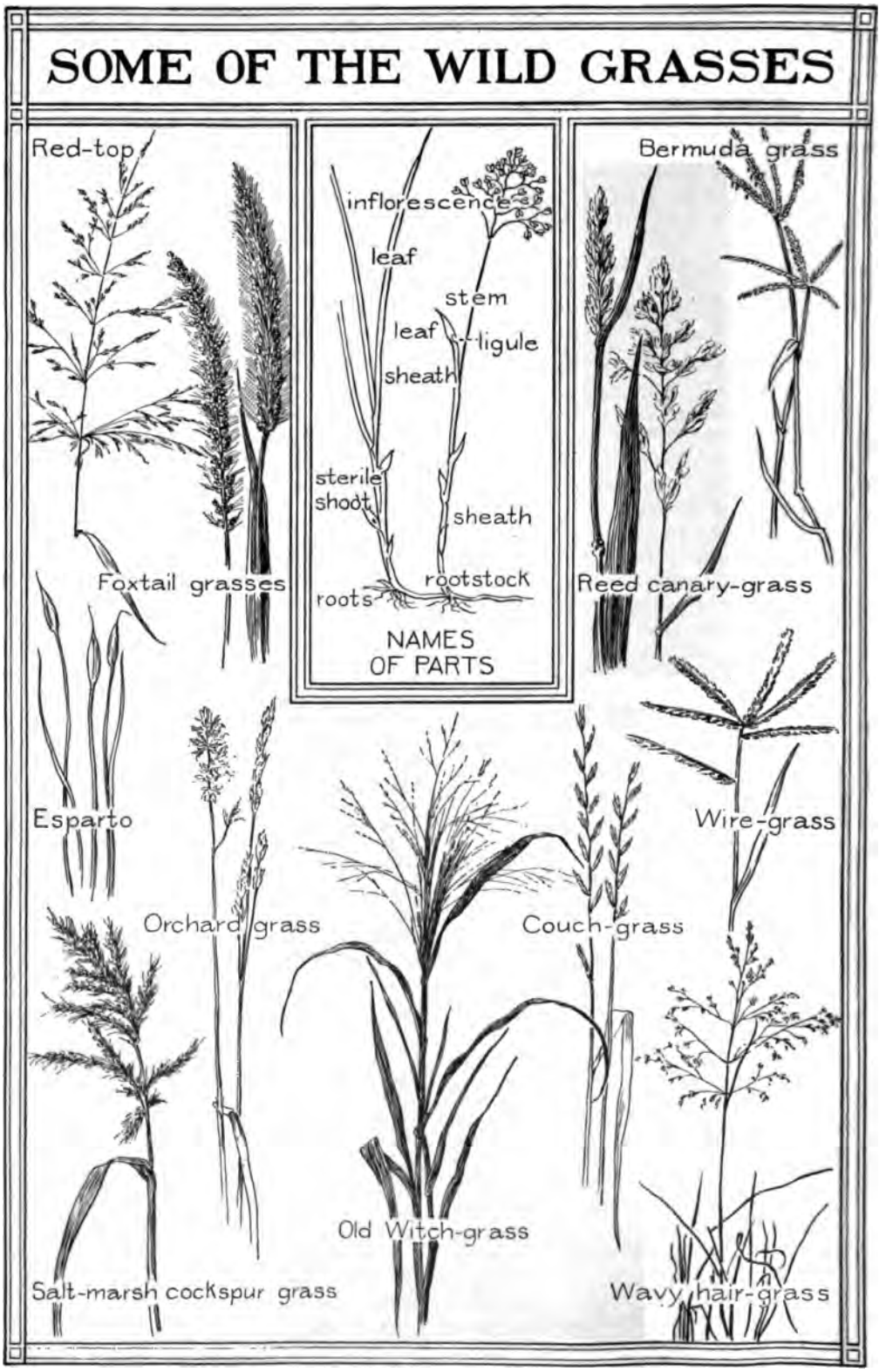
GRASS'ES, a family of plants remarkable for its wide distribution and variety of forms, and outranking all other families of the vegetable kingdom in point of usefulness to man. In the tropics the grass family is represented by the giant bamboos, that tower one hundred feet or more toward the sky; far to the North, mosslike grasses a few inches high struggle for an existence in the hard bosom of the frozen earth; and in the temperate regions the larger grasses clothe with a beautiful garment of green the meadows, lawns and hillsides. Says a botanical writer:

> Grasses there are, stout and higher than one's head, and grasses so slender that their dying stems among wayside weeds are like threads of gold; grasses whose panicles of bloom are more than half a yard in length, and of a color which only a midsummer sun can burn into August fields; grasses so stiff that winter's snow leaves them unbroken, and grasses so tiny that their highest flower is raised but a few inches from the soil.

The great grass family contains about 4,700 species, nearly 1,000 of which are found in the United States and Canada. The majority of grasses are herbs, but the treelike species, such as the bamboos, have woody stems. From the standpoint of utility, the bamboo (which see) is one of the most remarkable of the plants which man has found adapted to his needs, and there are many other grasses of great economic value. Esparto, a tough, coarse grass imported from Spain and North Africa, is used to a considerable extent in paper making and for stuffing mattresses. Sugar cane, also a member of the grass family, furnishes the world with about one-third of its supply of sugar.

Then there are the meadow and pasture grasses, valuable as a source of food for farm

SOME OF THE WILD GRASSES



nals. Among the principal pasture grasses red-top, blue grass, bent grass, blue stem Bermuda grass; the hay grasses include top, blue grass, timothy, orchard grass, dow foxtail, tall oat grass and rye grass. eal grasses, represented chiefly by wheat, ı, oats, rye, barley and rice, provide man ı the most important part of his vegetable l.

rasses are flowering plants which produce ers extremely complex in structure, and acterized by richness and variety of color-

All grasses have fibrous roots and nearly have hollow, jointed stems. According to ngement on the stem, the leaves are said e two-ranked; that is, each alternate leaf vs on the opposite side of the stem from one before it, which brings the third one ctly above the first and the fourth above second. The various species grow in every ety of situation—in dry, barren places, moist, rich soil, in marshes, in stagnant er, on inland prairies and along the sea-t. B.M.W.

elated Subjects. The reader who wishes to an appreciation of the economic importance he various members of the grass family is rred to the following articles in these vol-s:

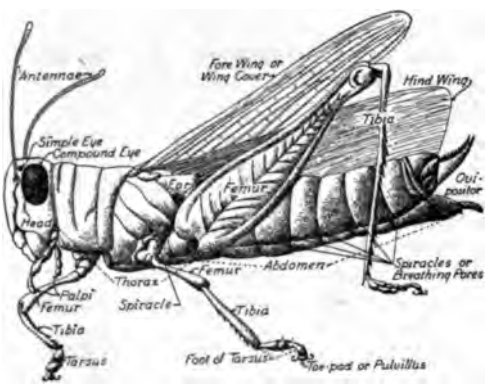
boo	Millet
ley	Oats
Grass	Popcorn
m Corn	Rice
e	Rye
ı	Sorghum
h Grass	Sudan Grass
arto	Sugar Cane
tail Grass	Sweet Flag
a Grass	Timothy
r Corn	Wheat
se	Wild Barley

RASS'HOPPER, the popular name for two ilies of straight-winged, leaping insects, h hop through fields or along dusty road-s the summer long. One species is described Leigh Hunt, in *To the Grasshopper and the ket,* as—

reen little vaulter in the sunny grass,
atching your heart up at the feel of June,
le voice that's heard amidst the lazy noon,
hen even the bees lag at the summoning brass.

are characterized by long, slender legs with e thighs adapted for jumping; by mouth-s fitted for biting; and by large, delicate l wings with strong powers of flight, pro-ed, when at rest, by thickened, tough fore gs which extend far beyond the end of the omen. The males produce a chirping sound rubbing their wing covers together, the sound varying according to the species. The chief differences are in coloring, habits and length of feelers, or horns.

Strange as it may seem, grasshoppers, with which should be included locusts, are used as food in some parts of the world. In desert and semiarid sections of Arabia and in the North African plains near the Red Sea they are eaten



PARTS OF THE GRASSHOPPER

by some tribes of native Arabs. The usual method of preparing them is by drying the insects thoroughly, then crushing the bodies in a mortar and making them into meal by adding water and sometimes a little syrup. The Indians of North America, particularly on the Great Plains, were once known to roast grasshoppers, and thus prepare them as a food delicacy.

Life History. Grasshoppers lay their eggs beneath the surface of the ground, commencing late in July. The female pierces a hole in the ground with her sharply-pointed abdomen and lays from twenty-four to thirty-six eggs, each one-fifth of an inch long. These are covered with a varnishlike film, and the mass then looks like a curved pod. Two of these pods are usually deposited by each female during her life. In the spring the eggs hatch into wingless creatures. Within eighty or ninety days, after shedding their skins, or *molting,* four or five times, the young are full-grown, with completely developed wings. In another week the insects mate, lay the eggs for another generation, and within three or four weeks shrivel up, wither and die.

Short-horned Grasshopper, or True Locust. Although commonly known as a grasshopper, this destructive species is a true locust; those insects which in America are called locusts are really *cicadas* (which see). To this species belong the *Rocky Mountain grasshopper,* which

in the years of 1874-1876 damaged several hundred millions of dollars worth of grain crops in Western United States, a similar species having also destroyed crops in Russia, Southern Europe and other countries; the *red-legged grasshopper,* common in Eastern America, having shorter wings than the western species; the light brown *Carolina locust* and the *American locust* of Southern United States. See LOCUST.

Long-horned Grasshopper. To this species, more delicate than the short-horned grasshoppers, belong the slender, green, harmless meadow grasshoppers, the dark-colored, wingless *cricketlike grasshoppers* or *cave crickets,* the *sand crickets,* and the interesting *katydids* (which see).

Grasshoppers furnish a large proportion of the food for many varieties of birds. M.S.

Consult Howard's *The Insect Book;* Kellogg's *American Insects.*

GRATTAN, *grat'an,* HENRY (1746-1820), an Irish politician and orator who, for his services to his country, was voted $250,000 and "a house and lands for him and his heirs forever" by the Irish Parliament. He was born in Dublin, was educated at Trinity College in Dublin, and in 1772 was admitted to the Irish bar. In 1775 he was elected as representative of Charlemont to the Irish Parliament, into which he infused such a spirit that mainly to him was due the partial abolishment of the heavy restrictions on Irish commerce. For his services in obtaining this great concession he was voted the gift above named. He became the head of the Irish Whig party and temporarily withdrew from Parliament, but returned in 1805 as representative for Malton and in 1806 for Dublin. His later years were spent in working for Roman Catholic emancipation. He did not have a strong voice, yet he ranked high as an orator. His invective against Bonaparte and his eulogy on Chatham are not surpassed in British eloquence. He died in London, and is buried in Westminster Abbey.

GRATZ, or **GRAZ,** *grahtz,* the capital of the Austrian province of Styria, 140 miles southwest of Vienna. It is beautifully situated in a broad and fertile valley on both banks of the Mur. On the Schlossberg, a hill 1,545 feet high commanding a fine view of the city, formerly stood the citadel and fortifications, which have been demolished to make room for pleasure grounds. The cathedral is a notable building dating from the fifteenth century. The city has excellent railroad facilities ; conducts a large trade in iron and steel go paper, woolen, cotton and silk goods, chemi and leather. Gratz is also noted for its lit graphic and printing establishments. It is of Europe's most ancient cities but nothin known of its history previous to the year 881. Population in 1910, 151,781.

GRAVITATION, *grav i ta'shun.* If you h an iron ball or a stone or some similar obj in your hand you will feel a power constar drawing it towards the ground. It is as tho something were trying to pull it out of y hand. And this is precisely true. Someth *is* trying to pull it out of your hand. It is t force which we call *gravitation* which is pull on the ball, trying to draw it back to the ea Every particle of matter in the universe tracts every other particle of matter. Gravi tion is the general term given to this attract wherever it exists—and it exists everywh It is the force which holds the universe gether.

The attraction that keeps the moon revo ing around the earth is gravitation. The fo that keeps the earth and other planets revo ing around the sun is gravitation. The fo that keeps all the stars of the heavens in th places is gravitation. Gravitation is the fo that holds bodies close to the earth's surf instead of permitting them to fly off ir space.

No matter how large or how small any giv bodies are, the force of gravitation is acti between them. A stone falls to the grou because the earth attracts it; but the stone turn attracts the earth. Each moves to m the other, but the stone passes through a mu greater distance than does the earth, simp because it is so much smaller. As a matt of fact, the mass of the earth is so great th its motion is imperceptible with relation to a small object; but, put it within close range a mass as large as the sun and it would drawn to the surface of that object just as stone is drawn to its surface.

The law of gravitation was discovered a formulated by a famous English mathem tician named Sir Isaac Newton. Tradition h it that Newton, as he sat in his beautif garden at Wollsthorpe one afternoon in t fall of 1665, saw an apple fall to the grou and this suggested a great truth to him. I began to inquire of himself why it was th the apple had fallen, and from this, as a begi ning, he formulated the laws of gravitatic

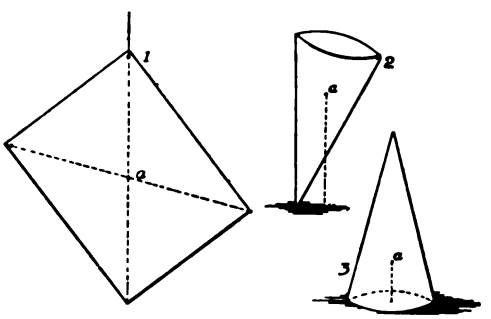
But when he tried to apply them he used figures for the various dimensions of the earth which were afterwards found to be wrong, and so, at first, he could not prove his law.

The general law of gravitation formulated by Newton is that every particle of matter in the universe attracts every other particle of matter in the universe with a force that is directly proportional to its bulk, or mass, and inversely proportional to the square of the distance between them. C.R.M.

Related Subjects. The reader is referred to the following articles in these volumes:

Earth	Mass
Falling Bodies	Newton, Sir Isaac
Gravity, Center of	Weight

GRAVITY, *grav'i ti,* CENTER OF. If you stick a pin through a point near the edge of a blotter and allow the latter to swing freely, it will come to rest at a position in which most of the blotter is below the point of suspension; if you move it, it will return always to this same position. There is one point in the blotter, however, called the center of gravity, or center of weight; if you stick the pin through this, the blotter will remain in whatever position you place it. How to find this center of gravity is shown at (1) in the illustration.

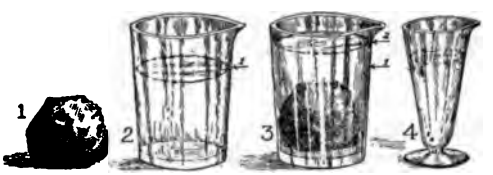


CENTER OF GRAVITY

When the force of gravity acts on an object it does so as if its power were all applied at the center of gravity. When a cone is in the position shown at (2), so that a line directly downward from the center falls outside of the object, the pull of gravity will upset the cone by drawing the center toward the earth. But in the position at (3), where a similar line falls within the base of the cone, gravity merely holds the article still, because to tip it in either direction the center must be raised. In the first case it is said to be in *unstable equilibrium,* in the second in *stable equilibrium.* Everyone knows that a board standing on end will fall, that one on its edge may be balanced but is easily overturned, but that a board resting on its broad side will stay in that position. From this it may be seen that the higher the center of gravity of an object, the more liable the object is to tip.

A center of gravity may be outside of its object, as in the case of anything hollow, like a boat or a dish. The point at which the attraction of the sun influences the earth is not the center of the earth, but the center of gravity of the earth and the moon combined, for although they do not form a single object, their mutual attraction makes it impossible for the sun to pull on one without pulling on the other and they are like a dumb-bell with one large and one small end.

GRAVITY, SPECIFIC. There was consternation at the court of Syracuse one day many hundreds of years ago when Hiero, the king, on receiving a new crown, decided that it was not made of solid gold, as he had ordered, but



AN EXPERIMENT IN FINDING SPECIFIC GRAVITY

Figure 1 is a stone. If it is immersed in water in Figure 2 it will raise the water in the tumbler as much as the space it occupies; that is, speaking scientifically, it will displace its own bulk of water. Figure 3 indicates the increase in the height of water. Figure 4 represents the water which equals the bulk of the stone. When that quantity of water and the stone are weighed it can height of water. Figure 4 represents the water is the stone. The resulting quotient is the *specific gravity* of the stone.

was alloyed with silver. He was furious! A king's crown has to be of purest gold. Besides, he did not intend to be cheated. But his problem was simple; he merely sent the crown to Archimedes with the command that he settle the matter.

Archimedes was one of the wisest men in Greece in the period about 200 years B.C. In the article under his name you will find an account of his life and the marvelous things he did. But Archimedes, for all his wisdom, was much puzzled by the problem presented to him. For a long time he was unable to devise a way of finding out whether the king's crown was actually made of pure gold, without destroying it. Then, one day, when he was getting into the bath, he noticed the spilling over of the water and it gave him his

inspiration. He would take the crown and put it into a vessel filled with water and note how much spilled over. Then he would take the same weight of pure gold and put it into a vessel containing exactly the same amount of water. If the crown were also of pure gold it would be exactly equal in bulk to the piece of gold and the amount of water displaced would be exactly the same in both cases. But if the gold in the crown were mixed with silver, it would be greater in bulk than the piece of pure gold, and the amount of water spilled over would show it. In short, Archimedes had discovered how to determine the *specific gravity* of a substance.

Specific gravity is the heaviness of a given quantity of a substance as compared with that of an equal quantity of another substance used as a standard. Water is usually taken as the standard of comparison for solids and liquids, while air is taken as the standard for gases. The specific gravity of a solid or liquid is the ratio between its weight in air and the weight of an equal volume of water; this ratio is secured by dividing its weight in air by the weight of an equal volume of water.

Archimedes' principle, that a body immersed in a fluid displaces an amount of the fluid equal to its own loss of weight, furnishes the most convenient method of finding the specific gravity of a substance. First weigh the substance in air; then weigh it in water; then subtract the weight in water from the weight in air. The result will be the weight of the volume of water displaced. Divide the weight of the substance in air by its loss of weight in water and you will have the specific gravity of that substance.

A piece of brass is found to weigh seventeen pounds in air and fifteen pounds when immersed in water. Fifteen from seventeen leaves two (the weight of an equal volume of water). Seventeen divided by two equals 8.5; therefore, 8.5 is the specific gravity of brass.

To find the specific gravity of a body lighter than water, weigh the body in air. Then take a sinker heavy enough to keep the body under water, and weigh the sinker in the air and in the water. Then weigh both the body and the sinker in water. By subtracting the loss of weight of the sinker in water from the loss of weight of the two bodies together, the loss of weight of the light body is obtained. Divide the weight of the light body by its loss of weight in water and the result is its specific gravity, which will, of course, be less than 1.

A block of wood weighs 12 ounces in the air, and a sinker 30 ounces. Together they weigh 42 ounces. The sinker weighs 25 ounces in water, the two together weigh 7 ounces in water. Subtract 7 (the weight of the two in water) from 42 (the weight of the two in air), and the remainder is 35 (ounces), the loss of weight of the two objects in water. From 35 subtract 5 (the loss of weight of the sinker in water), and the remainder is 30 ounces, the loss of weight of the body in water. Divide 12 (weight of body in air) by 30, and the quotient is 0.4, the specific gravity of the piece of wood.

In finding the specific gravity of a liquid, a specific gravity bottle is commonly used. This bottle is made to hold a certain weight of water, say a thousand grains. Fill the bottle with the liquid to be tested and weigh it. Divide the weight of the liquid in the bottle by the weight of water it is made to contain (1,000 grains), and the result is the specific gravity of the liquid. The specific gravity of a liquid may also be found by the use of a hydrometer (which see). C.R.M.

GRAY, Asa (1810-1888), recognized as the foremost American botanist of his day, was born at Paris Furnace, N. Y. After a few years spent in the practice of medicine he became curator of the New York Lyceum of Natural History. In 1838 he was appointed professor of natural history in the University of Michigan, and in 1842 accepted a like appointment at Harvard College. As the leading disciple of Darwin in the United States, he advocated and defended the theory of evolution as being in harmony with the strictest religious views. The collection of his brilliant discussions on the subject is entitled *Darwinia.* Professor Gray's writings include many valuable textbooks on American flora, some of which are *Field, Forest and Garden Botany; How Plants Behave; New Flora of North America,* etc. No other botanical textbooks than Gray's were used for years in the high schools of America. See Darwin, Charles.

GRAY, Elisha (1835-1901), an American inventor for whom his friends claimed the honor of invention of the telephone, denying the credit to Alexander Graham Bell. He was born at Barnesville, Ohio, and attended Oberlin College, maintaining himself there by working as a carpenter. Beginning his investigations in 1867, he took out nearly fifty patents for telegraph, telephone and other electrical appliances, including a type-printing and a writing or copying telegraph. In 1876 he filed in the Patent Office specifications for a telephone, but the patent was finally awarded to Alex-

ander Graham Bell (which see). Mr. Gray was for a number of years engaged in the manufacture of telegraph apparatus in Chicago and Cleveland. He was the author of *Harmonic Telegraphy and Telephony* and *Nature's Miracles*.

GRAY, GEORGE (1840-), an American jurist and legislator, who rendered his country distinguished service as member of such important arbitration boards as the Joint-High Commission between Canada and the United States (1898), the Anthracite Coal Strike Commission (1902), of which he was chairman, and the North Atlantic Coast Fisheries Arbitration of The Hague (1910). He was born at New Castle, Del., was graduated at Princeton College in 1859, and after studying law at Harvard was admitted to the bar in 1863. From 1879 to 1885 he was attorney-general of Delaware, being elected in the latter year to the United States Senate. In the Senate, where he served twelve years, he was one of President Cleveland's most loyal supporters at times when the President's quarrels with Congress reached the acute stage. He was appointed judge of the United States Circuit Court in 1899 and served until his resignation in 1914. Under the Hague Convention of 1900 Judge Gray was made a member of the International Permanent Court of Arbitration.

GRAY, THOMAS (1716-1771), an English poet, author of one of the best-known and also one of the most perfect poems in English literature, *Elegy Written in a Country Churchyard*. In the opening lines of this beautiful poem, Gray revealed himself as herald of the new movement in English literature that came to full flower in the first part of the nineteenth century (see ROMANTICISM):

> The curfew tolls the knell of parting day;
> The lowing herd winds slowly o'er the lea;
> The plowman homeward plods his weary way,
> And leaves the world to darkness and to me.

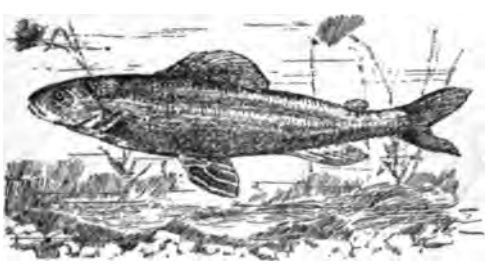
He was born in Cornhill, London, and studied at Eton College and at Cambridge University. He left the university without taking a degree, and from 1739 to 1741 traveled on the continent with his friend Horace Walpole, son of England's Prime Minister. Returning to England, he resumed his studies at the university, receiving a degree in 1743. He passed nearly all the rest of his life in Cambridge, devoted to writing and the study of literature.

The publication of his *Elegy,* in 1750, established his fame, and in 1757 he was offered the poet laureateship, which he declined (see POET LAUREATE). The same year appeared his odes, *The Progress of Poesy* and *The Bard.*

THE "CHURCHYARD" OF THE "ELEGY"
The place has changed but little in appearance since the poet's death. Beneath the window rich with ivy is the grave of Gray—an ideal resting place for one who has identified his name forever with its peaceful beauty.

The latter, a thrilling denunciation of the cruel King Edward, uttered by the last of the Welsh bards, is so filled with the spirit of Romanticism that it is justly considered one of the epoch-making poems of English literature. Then followed *The Fatal Sisters* and *The Descent of Odin,* which helped to bring the literary world to a realization of the romantic beauty of Norse mythology. Gray was also an admirable letter writer, and he composed very good Latin verse.

GRAY'LING, "the flower of fishes," so called by Saint Ambrose, the Bishop of Milan. This



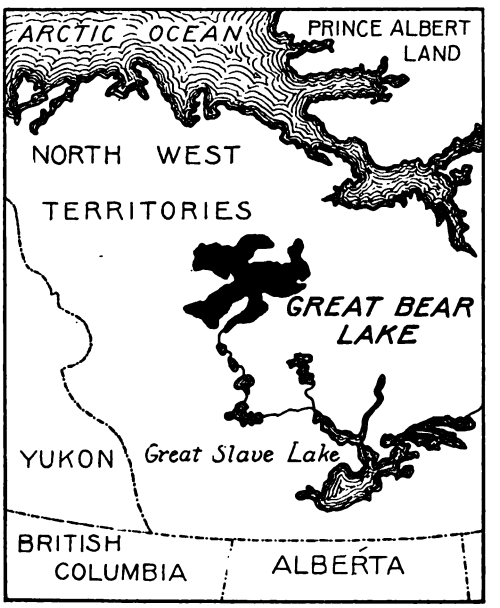
THE GRAYLING

family contains only five species, all of which are very beautiful and live in the rivers of cool or Arctic regions. In Europe they reach

a weight of four or five pounds, but in America the specimens rarely exceed one and one-half pounds. They are much like the small salmon in character and habits, but are more slender, graceful and active. They differ especially in the structure of the skull, for the head is short, the mouth small and the eyes very prominent, while their scales and dorsal fin are much larger. The three American species, Arctic, Michigan and Montana, which are about eighteen inches in length, are fine game fish and their flesh is a great delicacy. The American grayling is not widely distributed, for it is found only in the geographical sections which give the names to the three species.

GREAT AUSTRALIAN BIGHT, *aws tra' li an bite,* a bay of the Indian Ocean indenting the south coast of the continent of Australia. Its boundaries are not clearly defined, but it extends almost the entire length of the coast, sweeping northward from Tasmania along the coasts of Victoria and South Australia, to the most southerly point of West Australia. Numerous bays and gulfs indent the shores of Victoria and South Australia, but on the south of West Australia there are few bays and no natural harbors of any importance. The only large river flowing into the bight is the Murray, which carries with it the waters of the Darling and other tributaries.

GREAT BEAR LAKE, a large lake in the basin of the Mackenzie River, in Northwest Canada, so called because it lies partly within the Arctic Circle, beneath the constellation Great Bear. It is about 250 miles east of the Rocky Mountains, on low-lying land, the bottom of the lake being below the level of the Arctic Ocean. It has a very irregular outline and covers an area of 11,821 square miles, making it nearly as large as the state of Maryland, and more than one-half as large as the province of Nova Scotia. The water is very deep, and singularly clear and cold. Fish of many kinds abound, especially the herring-salmon. For more than half the year the lake



LOCATION MAP

is frozen. Fur-bearing animals are trapped in great numbers along its shores. The lake is fed by numerous rivers, the most important being the Dease, and is drained by the Great Bear River, which flows into the Mackenzie. In 1825 the second expedition of Sir John Franklin wintered on the shores of the lake and erected a fort named Fort Franklin, which was afterwards occupied as a trading post of the Hudson's Bay Company.

GREAT BRITAIN, *brit''n,* the largest island of Europe, and the most important island in the world. This "right little, tight little island," as its inhabitants affectionately call it, has acquired through the centuries an influence which reaches around the world. It is impossible even to imagine what the history of North America, of South Africa, of India, of Egypt would have been had it not been for the part in their history that has been taken by Great Britain.

What the Name Means. The name, in its Latin form, *Britannia Major,* is an old one, used to distinguish the island, dimly visible

across the channel, from Britanny, or *Britannia Minor,* in France. Politically it had no significance until the accession in 1603 of James I, who wanted some title to indicate his entire English and Scottish realm. As officially used, the name Great Britain includes England, Scotland and Wales, but popularly the term has a wider meaning, including Ireland as well, or even, by a still greater extension, designating the entire world-encircling British Empire. In this article, geographical treatment will be confined to the island itself, but in the discussion of government the whole empire will be considered. To gain a full and detailed knowledge of the United Kingdom, with its people, its industries, and its geographic features, it is necessary to read not only this article, but those on ENGLAND, IRELAND, SCOTLAND and WALES, as well.

Size and Location. Among the islands of the world Great Britain ranks sixth in size, the largest island, New Guinea, if Australia be excluded, having an area three and one-half times as large as Great Britain's 88,094 square miles. Great Britain is thus nearly twice as large as Pennsylvania, or about one-third as large as the Canadian province of Alberta. Of its area, England constitutes 50,867, Scotland 29,785, and Wales 7,442 square miles. Its greatest length is almost 600 miles, or two-thirds of the distance between New York and Chicago; its greatest breadth is in the extreme south, about 320 miles, while between the Firth of Forth and the Firth of Clyde it narrows to thirty-two miles.

Great Britain lies in the northwest of Europe, just north of France, and is separated from the Continent by the North Sea, the Strait of Dover and the English Channel. To the west, and separated from it by North Channel, the Irish Sea and Saint George's Channel, is another large island, Ireland, which at all times in its history has been closely associated with Great Britain, while all about it are groups of smaller islands, the Orkney, Shetland, Hebrides, Scilly and Channel Islands, and the Isles of Wight, Man and Anglesey, which are under its domination.

Its shape and location have given to Great Britain certain advantages which it has utilized to the full. First of all it has, by reason of its broken shore line and many deep indentations, a very long coast in proportion to its area—over 4,000 miles in all, or one mile to every twenty square miles of area. The vast continent of Africa, with its eleven million square miles and more, has but a little over four times as long a coast line. Because of this peculiarity, Great Britain has no point which is over seventy miles from the sea. Navigable rivers, too, decidedly enhance this advantage.

Then there is its location, in the temperate zone, but far enough north so that its northernmost points, where the summers are short, have a compensating length of day—seventeen hours of daylight in some places. Moisture is plentiful, too, because of the proximity of the warm waters of the Atlantic, and not only agriculture, but certain manufacturing industries as well, profit from this. Close to the great countries of Western Europe as it is, it has never lacked for markets to which to send its products, while the fact that it lies right between the great land masses of the globe has had much to do with its commercial importance. As noted in the article on England, however, these advantages would have gone for naught had the inhabitants of the island not been the progressive, able people that they are (see subheads *The People* in articles ENGLAND; SCOTLAND; WALES).

Physical Characteristics. Though the details of the surface features are given in the articles on the separate political divisions, a brief summary of them as they concern the island as a whole will be of interest here.

As regards elevation, Great Britain has four definite, well-marked regions.

(1) The *Highlands* of Northern Scotland, a rather barren, inhospitable mountain district, which contains among its ridges Ben Nevis, the highest point in the island, which reaches an altitude of 4,406 feet. In this section have developed those silent, rugged people who have preserved for so long their own peculiar customs and dress—the Scotch Highlanders.

(2) The Scottish *Lowlands*, south and east of the mountain region—an agricultural district with rich soil and with mineral wealth which has made possible thriving manufacturing industries. The Lowlands are much more thickly populated than the Highlands.

(3) The mountainous region which extends from Southern Scotland across Northwestern England and embraces practically all of Wales. One range of these mountains, the Cheviot Hills, forms a portion of the boundary between England and Scotland. These mountains are not so high as those of the Scottish highlands, nowhere attaining a greater height than 2,600 feet.

(4) The lowlands of England, to the south and east of the mountain district, the greatest agricultural region of the island.

Mineral Wealth. This, with the various industries, is treated in the separate articles, but

it is worthy of special note here. No other country in all the world has produced anything like so large a total of minerals. To-day, to be sure, the United States far exceeds Great Britain in its coal production, but less than a century ago Great Britain mined each year two and one-half times as much coal as all the rest of the world together, and three-quarters of a century ago it was producing more than half the world's output of iron. The amount of coal produced in the island is constantly increasing, but iron production seems at a standstill, and larger and larger quantities are being imported. If all the people who work in the coal mines of Great Britain could be brought together they would constitute a city larger than any in the island except London, for there are no fewer than 800,000 of them.

Manufactures. The history of the growth of manufactures in Great Britain has been one of absorbing interest. In early times the people of Holland, of France and of Flanders far surpassed the English in industrial skill and in the amount of manufactured products, and not until after the union of England and Scotland did British supremacy in manufacturing really begin. There were many causes which contributed to this—the abundance of iron and coal, as noted in the article ENGLAND; the growing commerce of the country, which made possible easy distribution, and the peculiar British inventive genius which gave to the country its labor-saving machines. It was in connection with the installation of machinery in the various factories that there occurred some of the most interesting events in all industrial history. Fear lest machinery would take from them their means of livelihood united with superstition to make the factory people hate the machines, and seldom was one set up without a riot. An excellent idea of this turbulent condition is given in *John Halifax, Gentleman,* which describes the difficulties its hero met in trying to introduce machinery.

For over a century after the factories were reorganized on the new mechanical basis, Great Britain produced more manufactured articles than any other country in the world, but in the latter part of the nineteenth century the United States had a very remarkable industrial development and menaced, if it did not quite take away, Great Britain's supremacy.

Transportation and Communication. Great Britain has, for its size, a large number of navigable rivers, and before the invention of railway transportation much was done to improve these. The country was crossed and recrossed by a network of canals, but since the coming of the railroads these have been in a large measure neglected. Certain of them, as

COMPARATIVE AREAS

England, Scotland, Wales and Ireland have a combined area of 121,331 square miles—less than 4,000 square miles greater in extent than the three states of Ohio, Indiana and Kentucky. Nevertheless, Britain's power is almost without limits.

the Manchester Ship Canal (which see), however, which is wide enough to admit of the passage of two huge seagoing vessels, are still of great importance. The roads are excellent, and while the old coaching days with their changes of horses at the wayside taverns are over, the highways have been a great boon to automobilists.

The railroads are the island's chief means of transportation, and Great Britain has the honor of having possessed the first railway of any importance, that which was opened in 1830 and ran from Liverpool to Manchester. Railroads increased rapidly and to-day the island has over 20,000 miles of track. Street railways are not nearly so numerous or so important as in the United States, there being in all less than 3,000 miles.

The outbreak of the War of the Nations in 1914 had a great influence on the railroads of Great Britain. Most of these were immediately taken over by the government, and though the general managers were left in control, they were made responsible to the government rather than to the stockholders. The prime consideration demanded was prompt and effective movement of troops, food and muni-

tions; and ordinary traffic was compelled to take a second place. The railroad employees showed great promptness in enlisting for military service, and one road, the North Eastern, sent so many volunteers that these were formed into a separate battalion.

Great Britain has excellent telegraph and postal systems, both of which are owned and controlled by the government. The income of the postal service is greater than its expenditure, but the telegraph service is carried on at a slight yearly loss.

Commerce. In treating this subject it must be kept in mind that it is in this aspect of its industrial life that Great Britain suffered most severely from the War of the Nations. That struggle broke in sharply upon the commercial supremacy of Great Britain, but just what its permanent effects will be, it is impossible to predict. Figures given below have reference to conditions just previous to the outbreak of the war.

Expansion of trade has been at the basis of Great Britain's desire for colonial expansion; protection of trade has been the incentive for its constant insistence upon naval supremacy, and from the time of Queen Elizabeth British commerce has been steadily growing. The British merchant marine is the largest in the world, and for many years has carried not only the commerce of Great Britain and its colonies, but much of that of other nations as well, including the United States. The imports have increased in value more rapidly than the exports, for certain manufacturing industries which once were carried on almost exclusively in Great Britain have been developed on the Continent as well, and in the United States and Canada. In the years just before the War of the Nations the total imports amounted to more than $3,843,000,000, while the exports were approximately $2,506,000,000, exclusive of imports reëxported. Practically all of the exports are manufactured articles and coal, while the imports are largely foodstuffs and raw materials. Of the countries engaged in trade with Great Britain, the United States is the largest furnisher of imports, Germany, British India, France and Argentina ranking next, in that order; while British India, Germany and Australia receive the heaviest exports in normal years.

Religion. Closely associated as they are, England and Scotland differ in their dominant religion (see ENGLAND and SCOTLAND, subheads *Religion*). In England the established church is the Church of England, while in Scotland the Presbyterian Church is strongest. It is an interesting fact that the Presbyterians who originated in Scotland and have there had their stronghold ever since are in England one of the least numerous of the dissenting sects.

The British Empire

Great Britain is but the nucleus of the British Empire—the largest empire in the world, with possessions on every continent and in every clime. "The sun never sets on British soil" is the Englishman's proud boast, and it is literally true. Nearly one-fourth of the land surface of the globe is included in this Empire, which has a total area of about 12,000,000 square miles, while the total population is estimated at more than 422,076,000.

The contrasts presented by the various parts of this vast, scattered empire are very sharp. There are great fertile sweeps, and there are desert stretches where none but the nomad can live (see NOMAD LIFE). There are great rivers, high mountains, large lakes, and there are other stretches of unvarying monotony, with neither mountain nor water to lend attractiveness. Some of the dwellers under the British flag are among the most intellectual, highly developed people in the world; others are rude, primitive peoples but little removed from savagery. Varied methods are necessary for dealing with these differing possessions, and several of these have been brought to a high state of development. In certain territories, known as *protectorates,* the native government continues in force, British representatives having merely advisory power. Most of the African possessions, as Nyasaland, Nigeria and Uganda, are of this rank.

Other territories are called *colonies,* and are governed by officials appointed by the British Crown. Of such colonies there are two classes —the self-governing, as Canada and the Commonwealth of Australia, in which the ministers are responsible to the colonial legislature, and only the Governor-General is under the control of the home government; and the *crown* colonies, so-called, the officials of which are directly controlled by the British department of state for colonies. In the following list, which contains the chief colonial possessions, with their area and population, no attempt is

made to distinguish between these different classes, but in the articles under the separate titles their standing will be indicated. Some of the subject territories have no census, and their population is merely estimated; and the total here given is not absolute, for colonies of minor importance have been omitted:

certain advantages in Africa, but whether or not the gain there is permanent, only the results of the war can tell.

The totals given are below rather than above the actual numbers, for all estimates are conservative, and in the population figures of many places the army and navy are not included. The government of these colonies and protectorates is dealt with under the subtitle *Government*, below, and also in the articles under the various titles.

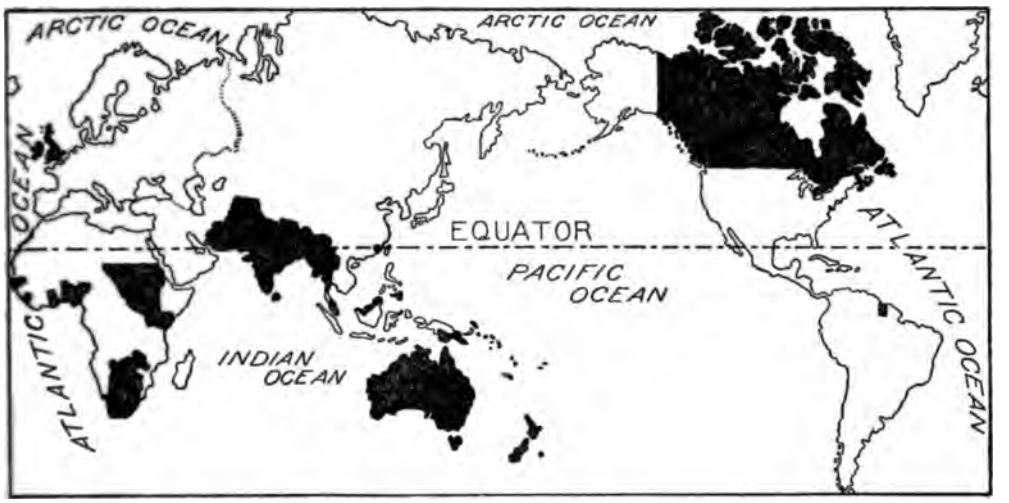
Colonial Possessions of Great Britain

LOCATION	AREA IN SQUARE MILES	POPULATION	LOCATION	AREA IN SQUARE MILES	POPULATION
In Europe			Southern Rhodesia	148,575	750,000
England	50,874	34,045,290	Nyasaland Protectorate	39,315	1,088,000
Ireland	32,360	4,390,219	Saint Helena	47	3,553
Scotland	30,404	4,760,904	Seychelles	156	24,140
Wales	7,466	2,025,202	Sierra Leone Protectorate	27,000	1,327,560
Isle of Man	227	52,034	Somaliland Protectorate	68,000	300,000
Channel Islands	75	96,900	Swaziland	6,536	99,959
In Asia			Uganda Protectorate	109,119	2,927,500
British India	1,093,074	244,267,542	Zanzibar Protectorate	1,020	197,200
Native States	709,118	70,864,995	*In America*		
Aden and Perim	80	46,165	Canada	3,729,665	7,206,643
Sarawak	42,000	500,000	Labrador	120,000	3,949
Socatra	1,382	12,000	Newfoundland	42,734	238,670
Straits Settlements	1,630	714,069	British Guiana	90,500	296,041
Ceylon	25,332	4,106,350	British Honduras	8,598	40,458
Mauritius and Dependencies	809	365,481	*In Australia*		
North Borneo	31,106	208,183	Commonwealth of Australia	2,974,581	4,455,005
Hongkong, including New Territories	390	456,739	Papua	90,540	400,000
Brunei	4,000	30,000	New Zealand	104,356	1,008,468
Weihaiwei	285	147,133	*West Indies*		
Malay Peninsula	52,416	1,936,968	Bahamas	4,404	55,944
In Africa			Barbados	166	171,982
Union of South Africa	473,100		Jamaica and Dependencies	4,373	836,998
Cape of Good Hope	276,995	2,564,965	Trinidad (including Tobago)	1,868	333,552
Natal	35,290	1,194,043	Leeward Islands	717	127,188
Orange Free State	50,389	528,174	Windward Islands	506	157,264
Transvaal	110,426	1,686,212	*Scattered Islands*		
Ascension Island	34	400	Fiji	7,435	139,541
Basutoland	11,716	405,600	Falkland Islands	7,500	3,275
Bechuanaland Protectorate	275,000	125,350	Solomon Islands	14,800	150,500
East Africa Protectorate	246,000	4,038,000	Bermuda	19	18,994
Egypt	350,000	11,189,000	Gilbert and Ellise Islands	180	31,121
Gambia	4,500	138,401	Gibraltar	2	19,586
Gold Coast	80,000	1,503,386	Tonga Islands	390	21,695
Nigeria	336,000	17,000,000	Malta	117	211,564
Northern Rhodesia	290,000	870,000	Cyprus	3,584	273,964
				12,230,457	433,411,624

It must be understood that the statistics here given represent conditions before the outbreak of the War of the Nations in 1914. The early stages of that war gave to Great Britain

Government

Great Britain has not, like the United States, and indeed, like most great countries, a single written constitution, but its government is none the less a strictly constitutional form. In fact, England has been a leader in developing constitutional government, and many other countries have patterned after it. Much of its constitution is unwritten—a mass of precedents, institutions, decisions which have been built up through the centuries and now have all the



PRINCIPAL POSSESSIONS OF GREAT BRITAIN

The small, black spot in the northwest corner of the map is the "mother country" to vast empires stretching around the world.

force of written laws. Many documents of the utmost importance there are, however—Parliamentary acts, royal decrees, judicial decisions, and above all, five instruments which are basic. These are the Magna Charta (which see), forced from King John in 1215; the Declaration of Rights in 1689; the Act of Settlement in 1701; the Act of Union with Scotland in 1707; and the Act of Union with Ireland. Such a constitution is far more flexible and easily changed than a single written document drawn up by a constituent assembly, and it is constantly changing.

Central Government. The government of Great Britain is a hereditary constitutional monarchy, the preference being given to male heirs.

Executive Branch. Nominally, the Crown holds the supreme executive power, and there have been kings in the long course of English history who have actually been all but absolute. One power and privilege after another has been assumed by Parliament, however, and the Crown retains merely such rights and duties as have not been forbidden it by Parliament. Among those powers which still remain to the Crown are the declaration of war; the making of treaties; the granting of pardons and the issuing of passports; the appointment of diplomatic and many administrative officers; the command of the army and navy; the appointment of high officers in the Church of England, of which the king must be a communicant; and the summoning and dissolution of Parliament. Now, in theory at least, Great Britain has never departed from the doctrine that "the king can do no wrong"—that is, Parliament can never hold him responsible for any of his acts.

Since entire irresponsibility on the part of the executive works for despotism, the actual executive supremacy is vested in the king's advisory body—the *Ministry,* or *Cabinet,* which is directly responsible to Parliament. The ministers must be members of Parliament, and belong to the party which at the time is in the majority in the House of Commons. Custom has outlined the method of procedure thus: The leader of the majority in the House of Commons is invited by the king to choose a Cabinet, usually accepting himself the post of Prime Minister, or Premier. After consultation with other strong men of his party, this leader sends to the king a list of the men he thinks most suitable as heads of the various departments, and the king at once appoints them. These Cabinet members may be members of the House of Lords or of the House of Commons, but if of the latter, they must immediately resign and come before their constituents for reëlection. Unless they have made themselves extremely unpopular—in which case they would not be likely to be chosen by the leader—they need not fear the results of this election.

These ministers perform a very important legislative function, for almost every prominent measure brought forward in Parliament is introduced by them. If the Cabinet advances some policy on a serious question and

Parliament defeats it, the ministers must resign, but they have the privilege of requesting at once a new election. If the people refuse to support the policy by reëlecting the ministers, their resignation becomes unconditional. Strange as it may seem, this body—so important that it may even sign treaties without consulting Parliament—has no mention in any of the various documents which make up the written portion of England's constitution. No act of Parliament has ever sanctioned it, but it has simply grown up out of the old custom of the kings, more or less informal, of choosing wise men to act as their advisers.

Each Cabinet member is head of an administrative department, but the heads of all departments are not of necessity members of the Cabinet. If it seems, for instance, that during a certain Parliamentary session the Irish question is not likely to assume any importance, the lord lieutenant of Ireland is not given a seat in the Cabinet. Eleven department heads are always in the Cabinet, and at times that body has a membership of twenty. The eleven are as follows: First lord of the treasury—usually the Prime Minister, though that officer may choose some other portfolio if he sees fit; the lord chancellor; lord privy seal, who affixes to public documents the great seal of state; the chancellor of the exchequer; the lord president of the council; the first lord of the admiralty, who is the head of the naval board; and the five secretaries of state: for home affairs, for foreign affairs, for the colonies, for India and for war. Other ministers who frequently have seats in the Cabinet are the lord lieutenant of Ireland; lord chancellor of Ireland; the secretary for Scotland; the commissioner of works; the president of the local government board; the president of the board of trade; the president of the board of agriculture and the chancellor of the Duchy of Lancaster. No records are kept of the meetings of the Cabinet, nor of its acts, on which the history of the empire so largely depends. See CABINET.

Legislative Branch. The supreme legislative power is vested in a Parliament of two houses—the House of Lords and the House of Commons. In the upper house the peers, or lords temporal, and the archbishops and principal bishops, or lords spiritual, have seats. There are in all, somewhat over six hundred members—about five hundred English hereditary peers; twenty-eight Irish peers chosen for life by the whole body of Irish peers; sixteen Scottish peers, chosen for one term of Parliament by the whole body of Scottish peers; two archbishops and twenty-four bishops, and four judicial members chosen by the Crown. By custom, though not by law, the lord chancellor is the presiding officer of the House of Lords.

The House of Commons is an elective body of 670 members, of which England chooses 465, Wales 30, Scotland 72, and Ireland 103. They are chosen by districts for a period of seven years, and a member need not live in the district from which he is elected. A term of Parliament is seven years, but almost always the body is dissolved before the expiration of that time by the king, with the advice of his ministers.

The time-honored privileges and powers of the two houses have been very nearly alike, save that all financial matters must originate in the lower house, and no proposal could become a law without the assent of both houses. This gave the House of Lords the power to veto so many progressive movements that it was felt that some remedy was necessary. In 1832, when the Reform Bill was in question, Earl Grey induced William IV to threaten to create enough new peers to put the measure through; for there is no limit to the number of hereditary peers the king may create. Rather than submit to this, the peers passed the bill. But in 1911 a remedy was found for like conditions. A law was passed declaring that when the House of Lords has three times vetoed a measure passed upon by the House of Commons, the latter body may pass it over the veto of the upper house. This means that the House of Commons is certain of the success of any movement on which it feels strongly enough to insist.

The Judiciary. The House of Lords is not only the highest legislative, but the highest judicial body in the kingdom. If a peer commits a crime or misdemeanor, he is brought before the House of Lords for trial; if any public official is to be impeached, or any case appealed from a lower court is to be reopened, it is this body which has jurisdiction. But in cases appealed from a lower court the whole House does not act—only the lord chancellor, the four judicial members, and such other peers as may previously have held judicial offices; these peers are known as the Lords of Appeal. A coördinate body is the Judicial Committee of the Privy Council, which con-

sists of practically those same peers who have the right to hear appealed cases in the House of Lords. Before this Judicial Committee are brought cases appealed from the colonies. See PRIVY COUNCIL.

In addition to these, there are the High Court of Justice and Court of Appeal; the petty sessions and quarter sessions, which are criminal courts, and the assize courts (see COURTS, subhead *Courts in Great Britain*).

Local Government. It is difficult for anyone not thoroughly conversant with the local government system of Great Britain to understand it, so complicated and involved is it. Only since the passage of local government acts in 1888 and 1894 has it had any right to the name of system, so inconsistent has it always been. The units of government now are counties, boroughs, urban districts, rural districts, parishes and school districts. In each county there is a lord lieutenant—the representative of the Crown—together with a sheriff, justice of the peace, clerk of the peace and coroner; and each county has, as well, a council elected by popular vote, which has charge of finances, charities, local education, bridges and roads and the police system.

Counties are subdivided into *urban* districts and *rural* districts, each with its own council, which has charge of the poor laws and health laws, and other minor matters; and below the district is the *parish*, governed by an assembly consisting of every voter and all the married women. Incorporated towns are known as *boroughs*, and each one has a mayor, aldermen and councilors, who together form the council. London has special treatment. The county of London, which includes the city, is divided into twenty-nine boroughs, each of which has the same officers as any other borough. At the head of the whole complex system is a local government board, whose president is sometimes, though not always, a member of the Cabinet. The tendency at present is to increase the jurisdiction of this board.

Administration of Colonies. As noted above, the governmental systems applied to the administration of the numerous British colonies are of necessity various. A very general idea of such variation is given under the subhead *British Empire*, above, but a strict division calls for the following classes:

(1) Self-governing dominions, or those which have their own legislature and courts, but a governor appointed by the Crown. See CANADA; AUSTRALIA; NEW ZEALAND.

(2) Semi-independent colonies, which have a legislature partly elected and partly appointed, and a governor appointed by the Crown. See BRITISH GUIANA; CYPRUS; MALTA; JAMAICA.

(3) Colonies and protectorates which have a legislative council appointed by the Crown. Such is that great empire within an empire, India, with its British territory and native states. See INDIA; CEYLON; BRITISH HONDURAS; THE STRAITS SETTLEMENTS; GOLD COAST; BRITISH HONDURAS.

(4) Colonies and protectorates not possessing a legislative council, but governed by a royal commissioner. See BASUTOLAND; GIBRALTAR; UGANDA; SAINT HELENA.

There are certain territorial possessions which do not, strictly speaking, fall under any of these heads, but these include most of the important ones.

For the administration of Scotland and Ireland, see the articles on those countries, subhead *Government*. Wales needs no separate treatment, for it has been governed since the sixteenth century as a part of England. Any right or privilege which an Englishman has, a Welshman possesses in equal degree.

Defense. The problem of defense presented to Great Britain has been in one way peculiar. Itself an island, but an island with scattered possessions enough to make up the largest empire in the world, it has needed especially a strong navy, and toward the building of that attention has been directed with such good results that England has had since the decline of Spain centuries ago no rival on the sea. Its policy has been to maintain a navy which should at least equal in strength the combined navies of any two other countries in the world, and toward that end ships were multiplied rapidly during the latter part of the nineteenth and the first part of the twentieth centuries. The great merchant marine has been an added resource, for a certain number of seamen have been drilled to render service in the event of war. For statistics on Great Britain's navy see the article NAVY, subhead *Great Britain;* for the manner in which it has recently acquitted itself in actual service, see WAR OF THE NATIONS.

But if the navy of Great Britain has been the strongest in the world, the same cannot be said of its army. While on the Continent compulsory military service has been the rule, in Great Britain the principle of voluntary service has been rigidly adhered to, and as a result the British army has been the weakest among all the armies of the great European nations. The forces have been divided, since 1907, into two classes—the regular army with

its reserve and special reserve, and the territorial force, which, contrary to its name, is intended for home defense and is under no obligation to serve abroad. The strength of the armies of Great Britain, as compared with those of the other powers, is given in the article ARMY, subhead *British Army*. In this connection see WAR OF THE NATIONS.

History of Great Britain

The Union with Scotland. Although, as pointed out in the article ENGLAND, that country and Scotland had had one ruler since the accession of James VI of Scotland to the throne of England in 1603 as James I, the two countries had retained their separate legislatures, and were thus not really one country. In 1707 the Scottish Parliament was given up, and Great Britain as a political unit came into being. A new flag was adopted—the Union Jack, made by combining the white cross of Saint Andrew with the red cross of Saint George. At first there was a strong popular feeling in Scotland against the union, but gradually there arose the realization of the fact that the interests of the country were better conserved than under the old dual arrangement.

Accession of the House of Hanover. Queen Anne was the last Protestant Stuart, and when she died in 1714 the Crown passed, not to her half-brother, the Catholic son of James II, but to George, Elector of Hanover, a descendant of James I. The new king had no interest in England; he had been a German all his life, and a German he intended to remain. He was perfectly willing, to be sure, that the new kingdom should minister to his support and furnish him funds for his enterprises on the Continent, but as for the government, that could be attended to by the leaders of the Whigs, the party which had brought him to power. It was this very indifference on the part of the king which made possible the establishment of the present form of government, for Sir Robert Walpole, the Whig leader, was in reality the first Premier, though he did not assume that title; and he it was who began the custom of selecting from his colleagues an advisory body, the Cabinet. The king did not even attend their meetings; why should he, when he could not understand a word of English, and did not care to learn the language?

During this reign occurred the insurrections in the interests of James Edward Stuart (which see), the "Pretender," and the failure of that gigantic enterprise known as the South Sea Company (which see), which involved in its disaster great numbers of people and seriously embarrassed the government. Only the genius of Walpole served to bring a certain measure of order out of this crisis. Another important event, as beneficial as this was disastrous, was the introduction of the practice of inoculation for smallpox. This meant the conquest of one of the worst scourges of Europe, for even in years when there was no epidemic the disease killed off about one person out of ten in England, and a proportionate number in other countries.

Growth of Colonial Interests. George II, who came to the throne in 1727, was much like his father in his indifference to English interests. He hated Walpole, but was wise enough to keep him in power, interfering with him little except by attempting to induce him to involve England in the various struggles which were taking place on the Continent; for George II was above all things a soldier. In 1739 the country became so incensed over certain barbarities of Spain toward English traders in the West Indies that Walpole was forced against his will to declare war, and the result was far from favorable for England. This war was a sign that the New World, as it was then called, and England's trading and colonial interests there were becoming of greater importance. In the next war in which England took part—the War of the Austrian Succession—George II led the British troops in person, the last English king to take part in a battle.

But the great struggle of the reign was the Seven Years' War, which in its American phase was known as the French and Indian War. By it England's colonial interests were decidedly advanced at the expense of France, for Clive (which see), by the great battle of Plassey, established British rule in India on a firm foundation, and Wolfe won Canada by his victory over Montcalm at Quebec. Indeed, at the close of the war England was supreme over the North American continent from the Atlantic to the Mississippi.

The reign of George II witnessed another movement less spectacular but as lasting in its results—the rise of Methodism. Such a religious revival was sorely needed in an age

which saw nothing strange in such tavern signs as "Drunk for a penny; dead drunk for twopence; clean straw for nothing."

The Break with America. When George III came to the throne in 1760 he proved to be very different from his father and his grandfather. A man of excellent character, he had the best interests of his kingdom at heart and was unwilling that the ministers should continue to exercise all the power. The royal authority should be asserted, the king should dictate to the ministers instead of their dictating to him—those were the reforms which he was determined to carry through. Pitt resigned and was succeeded by Bute, who in turn gave place to North, a minister completely after the king's own heart; and it was the king and North who advocated those policies which terminated in the outbreak of the American Revolution. The king was honestly unable to see the injustice of taxing the colonies when they had no representation in Parliament, or the folly of keeping them utterly dependent, as it was his aim to do. The necessity of acknowledging the independence of the United States was a great grief to him, nor could he ever be brought to see the unwisdom of his own course. See REVOLUTIONARY WAR IN AMERICA.

War with France. Just at the close of the American Revolution, in 1783, Pitt, son of the earlier minister of that name, was made Premier; until his death, twenty-three years later, his voice was dominant in English affairs. He it was who carried on the war against France so vigorously that Nelson was able to establish by his victory at Trafalgar the supremacy of England on the sea, and that Wellington was empowered to give a severe blow to Napoleon's cause by driving the French out of Spain. In the Congress of Vienna, which readjusted the affairs of Europe after the long turmoil, England secured very favorable terms, and gained possession of certain valuable territories. All the results of the struggle with Napoleon were not beneficial, however, for a large debt was placed upon the people, and taxes were made painfully heavy. This condition had been rendered more serious by a second war which occurred while the first was still in progress—the War of 1812 with the United States.

Another important event took place during the Napoleonic struggle. A revolt in Ireland strengthened the feeling of the English statesmen that that country should be made a part of England, and in 1800 an Act of Union was passed. Pitt made Roman Catholic emancipation a part of his proposal, but to this the king would not consent, nor was it finally secured until 1829 (see O'CONNELL, DANIEL).

The Reform Era. It is significant of the gradual decrease in the power of the kings that reform measures should have occupied much of the public attention during the reign of George IV (1820-1830), a king who had no interest in reform of any kind. The people, suffering under the heavy burdens laid upon them by the wars, were openly murmuring, and one leader after another found it expedient to listen to their demands. Sir Robert Peel, in 1823, brought about the reform of the criminal laws, doing away with the death penalty for many minor offenses; in 1828 the Duke of Wellington, stanch Tory that he was, brought about the repeal of the obnoxious Test Act; and Roman Catholic Emancipation has been referred to above.

It was after the accession of William IV, in 1830, that the chief reforms were put through. The matter of Parliamentary elections sadly needed reform, and Earl Grey devoted all his energies to bring about a redistribution of the franchise in accordance with population. By inducing William IV to agree to the creation of a number of new peers he compelled the House of Lords to pass the Great Reform Bill of 1832 (see GREY, CHARLES), and he also carried out a number of minor reforms. Slavery in the colonies was abolished in 1833, and beneficial changes were made in the poor laws and the factory laws.

Queen Victoria (which see) was only a girl when she came to the throne in 1837, but she had the wisdom to adopt at the very outset of her reign the policy which she pursued to the end—the policy of allowing her ministers to deal with political matters without her interference. Her moral influence, however, and that of her husband, Prince Albert, was very plainly felt in every department of national life. Her long reign was glorious, and the list of its statesmen includes Peel, Bright, Cobden, Russell, Palmerston, Salisbury, Disraeli and Gladstone (whose lives are given in these volumes). Noteworthy among the reforms of the early part of the reign was the repeal of the Corn Laws (which see) in 1846; while among the reform measures of the later period of her reign was the Act of 1867, which broadened the franchise and gave the workingmen a voice in the government. The country was making strides towards democracy.

The life of the country was practically revolutionized during the period that Victoria was on the throne. At the beginning there were but a few miles of railway in the kingdom, and there was not a telephone or a telegraph line; before its close railways ran everywhere, people talked to each other from end to end of the kingdom and messages flew over thousands and thousands of miles of wire.

Wars of the Reign. It had been the policy of England since the early nineteenth century not to be drawn into wars unless it was absolutely necessary, but struggles could not always be avoided. There was the Crimean War of 1854-1856, in which England successfully engaged in checking the ambitious designs of Russia; the Sepoy mutiny of 1857, which had as its result the transfer of India from the authority of the East India Company to that of the Crown; and the South African War of 1899-1902, which resulted in the annexing of the Transvaal and the Orange Free State to the empire as colonies. Each of these wars is treated under its own title.

The Twentieth Century. More than ever before it was noticeable during the reign of Edward VII (1901-1910), son of Queen Victoria, that Great Britain was an empire in more than name. The colonies had shown their loyalty during the war in South Africa, and they began to give evidence in other ways of the fact that they felt themselves to be a part of one great country. The Australian colonies were federated in 1901 into a Commonwealth, but the relations with the mother country were closer and more cordial than ever before. During Edward's reign a crisis was reached in Parliamentary affairs, the question of the veto power of the House of Lords becoming acute. Edward's death and the accession of his son, George V, in 1910, caused a temporary cessation in the strife over the budget question, but in 1911 there was passed a bill which made a greater change in Parliamentary affairs than had any legislation since the Reform Bill of 1832. This was the removal from the upper house of the permanent veto power. It declared not only that the upper house had no right to amend or reject a financial bill, but that any bill which was passed by the Commons at three successive sessions became a law despite the disapproval of the House of Lords.

The early years of the reign of George V were marked by severe labor troubles in 1911 and 1912, including a number of serious strikes; the disestablishment of the Church of England in Wales in 1914; and the passage of the act allowing home rule to Ireland (see HOME RULE). Out of this Home Rule Bill there grew a disturbance in the Irish county of Ulster, which for a time was very acute. The Orangemen there refused to countenance home rule because it would mean the dominance in the island of the Roman Catholic faction, and actual civil war was averted only by the outbreak of a greater struggle—the War of the Nations, which began in the summer of 1914.

Great Britain and the War. The violation of Belgian neutrality by Germany was announced by Great Britain as the cause which led it to declare war on Germany on August 3, 1914. The military and naval forces of the empire were at once mobilized. The colonies showed wonderful loyalty, sending volunteers in great numbers, while in the kingdom itself —in England, Ireland and Scotland—the unanimity of purpose was even more remarkable. Possibly never before in all its history had the nation been so entirely united on any great matter. The military events of this greatest conflict of all times are treated in the article WAR OF THE NATIONS. A.MC C.

Consult Dilke's *Greater Britain;* Seeley's *The Expansion of England;* Fox's *British Empire;* Besant's *The Rise of An Empire.*

Related Subjects. Of the numerous articles in these volumes which are connected with the subject of Great Britain, many are listed in the indexes under ENGLAND, IRELAND, SCOTLAND and WALES. The following list will simplify reference not only to those indexes but to the topics below as well:

CITIES AND TOWNS

See lists under ENGLAND, IRELAND, SCOTLAND, WALES.

COLONIES

See list in article above.

GOVERNMENT

Cabinet	Magna Charta
Empire	Parliament
Exchequer, Chancellor of the	Premier
Flag	Privy Council
Imperialism	Privy Seal
King	Supremacy, Royal

For more general topics, see list under CIVIL GOVERNMENT.

HISTORY

For earlier history, see lists of *Related Subjects* under ENGLAND, IRELAND, SCOTLAND, WALES.

Alabama, The	Black Hole of Calcutta
Balaklava	Boston Massacre
Bering Sea Controversy	Boston Port Bill

OUTLINE AND QUESTIONS ON GREAT BRITAIN

Outline

I. Size and Location

(1) Rank among islands of the world
(2) Actual size, 88,094 square miles
(3) Situation with reference to Europe
(4) Effect of shape and position

II. Physical Features and Industries

See outlines on *England, Scotland, Wales*

III. Transportation and Commerce

(1) Navigable rivers
(2) Canals—neglected state
(3) Railroads
(4) Foreign trade
  (a) Effects of, on history and on naval supremacy
  (b) Merchant marine largest in world
  (c) Imports greater than exports

IV. Colonial Possessions

(1) Extent of empire
(2) Protectorates
(3) Colonies
  (a) Self-governing
  (b) Crown colonies
(4) Government

V. Government

(1) Unwritten law
(2) Central government
  (a) King
  (b) Cabinet
  (c) Parliament
    1. House of Commons
    2. House of Lords
  (d) Courts
(3) Local government
(4) Defense
  (a) Army
  (b) Navy

VI. History

For early stages, see *England, Scotland, Wales*

(1) Union with Scotland
(2) The accession of the Hanoverians
(3) Spread of empire
  (a) In America
  (b) In India
(4) Revolutionary War in America
(5) The Napoleonic struggle
(6) An era of reform
(7) Recent happenings
  (a) Imperial growths
  (b) South African War
  (c) Irish Home Rule question
  (d) War of the Nations

Questions

What change was made in the management of railroads at the outbreak of the War of the Nations?

What happens to the Cabinet when an important measure is defeated?

Sketch briefly the part which Great Britain has played in the development of Australia; of North America.

How can the country be governed without a constitution?

What part has British inventive genius played in bringing about the great growth of the country?

If Great Britain were deprived of all that has grown out of the victories of Clive and Wolfe, how much smaller would its empire be?

Why was there objection to Irish Home Rule in Ireland itself?

How many islands as large as Great Britain would its greatest colonial possession make?

What king of England could not speak English?

Show by means of a globe that "the sun never sets on British soil."

Describe the British flag. How was it made?

How does the merchant marine of Great Britain rank with those of other countries?

How did a law of 1911 in Which Home Rule was not mentioned secure Home Rule for Ireland?

Boston Tea Party
Brandywine, Battle of the
Brunswick, Family of
Bunker Hill, Battle of
Chartism
Clayton-Bulwer Treaty
Continental System
Corn Laws
East India Company
Fifteen Decisive Battles
French and Indian Wars
Germantown, Battle of
Ghent
Guilford, Battle of
Hay-Pauncefote Treaty
Intolerable Acts, Five
Jay Treaty
Leipzig, Battles of
London Company
Long Island, Battle of
Louisburg Sieges of
Lundy's Lane, Battle of
Navigation Acts
Orders in Council
Paris, Treaties of
Powers, The Great
Quebec, Battle of
Quebec Act
Quebec Resolutions
Queenstown Heights, Battle of
Revolutionary War in America
Rotten Boroughs
Saratoga, Battles of
Sepoy Rebellion
South African War
South Sea Company
Stamp Act
Test Acts
Thames River, Battle of the
Trafalgar
Trent Affair, The
Trenton, Battle of
War of 1812
War of the Nations
Waterloo, Battle of
Webster-Ashburton Treaty

LITERATURE

See ENGLISH LITERATURE.

The biographies of eminent men contain much historical matter. The rulers are listed in the article ENGLAND, and the soldiers and statesmen of the early period are given in the *Related Subjects* index under that article.

SOLDIERS AND STATESMEN

Abercrombie, James
Aberdeen, Earl of
Andre, John
Argyll, Dukes of
Asquith, Herbert Henry
Baden-Powell, Robert S. S.
Balfour, Arthur James
Braddock, Edward
Bright, John
Bryce, James
Burgoyne, John
Burke, Edmund
Carleton, Sir Guy
Chamberlain, Joseph
Chesterfield, Earl of
Churchill, Winston L. S.
Clinton, Sir Henry
Clive, Robert
Cobden, Richard
Cornwallis, Charles
Curzon, Lord
Dufferin and Ava, Marquis of
Fox, Charles James
Gage, Thomas
George, David Lloyd
Gladstone, William E.
Gordon, Charles George
Grey, Earl
Grey, Sir Edward
Harcourt, Sir William George
Hastings, Warren
Havelock, Sir Henry
Howe, Sir William and Richard
Hutchinson, Thomas
Jameson, Leander Starr
Kitchener, Earl
Lansdowne, Lord
Lytton, Edward Robert Bulwer
Macaulay, Thomas Babington
Marlborough, Duke of
Milner, Alfred
Monck, Lord Charles
Moore, Sir John
Morley, John
North, Lord
Outram, Sir James
Pakenham, Sir Edward M.
Palmerston, Viscount
Pauncefote, Julian, Lord
Peel, Sir Robert
Pitt, William
Redmond, John Edward
Rhodes, Cecil John
Roberts, Earl
Rosebery, Archibald P. P.
Russell, John
Saint Leger, Barry
Salisbury, Marquis of
Shaftesbury, Earl of
Walpole, Horace
Wellington, Duke of
Wilberforce, William
Wolfe, James
Wolseley, Garnet Joseph

ISLANDS

See classified list under article ISLAND.

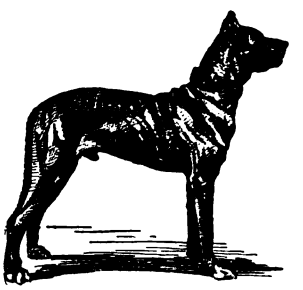
PRODUCTS

See lists under ENGLAND, IRELAND, SCOTLAND, WALES.

RIVERS

See lists under ENGLAND, IRELAND, SCOTLAND, WALES.

GREAT DANE, the name given to a breed of large dogs which are noted for their great strength, agility and handsome appearance. The breed originated in Denmark, from which fact the name is derived; they were formerly used there for hunting boars and deer. Great Danes vary greatly in color, the most highly-prized usually being fawn or brindled, but a dark bluish-gray is popular. They are usually about the same size as mastiffs, often weighing 100 pounds, and make affectionate and faithful companions.



THE GREAT DANE

GREATER ANTILLES, *an til'eez.* See ANTILLES.

GREATEST COMMON DIVISOR. The greatest common divisor (G. C. D.) of several numbers is the largest number which will exactly divide each of them; for example, 14 is the G. C. D. of 42, 70 and 98; 3 is the G. C. D. of 15, 24 and 21.

The greatest common divisor is also called the *highest common factor.* (See FACTORING and study it in connection with this subject.)

$8 \times 13 = 104$	$104 \div 13 = 8$
$5 \times 13 = 65$	$65 \div 13 = 5$
$3 \times 13 = 39$	$39 \div 13 = 3$
$7 \times 13 = 91$	$91 \div 13 = 7$

(a) We see here how 104, 65, 39 and 91 are built up, 13 being the factor common to all; being, moreover, the only factor common to all, it is the highest common factor.

(b) Since 13 is the largest *factor* common to these numbers, it is the largest number that will *divide* each of them.

(c) The *largest common factor* that goes to make up several numbers is the *largest divisor* that is found in each of the numbers.

(d) Therefore, in seeking the G. C. D. we seek for the *highest common factor.*

(1) Find the G. C. D. of 16, 40, 72. Factoring, we see:

$$16=2\times 8$$
$$40=5\times 8$$
$$72=9\times 8$$

and recognize 8 as the G. C. D.

(2) Find the G. C. D. of 75, 45, 105, 135.

$$75=5\times 5\times 3$$
$$45=3\times 5\times 3$$
$$105=7\times 5\times 3$$
$$135=3\times 5\times 3\times 3$$

Here we find 5×3, or 15, to be the G. C. D.

(3) Find the G. C. D. of 672, 504, 924.

$$672=(2\times 2)\times 2\times 2\times 2\times 3\times 7$$
$$504=(2\times 2)\times 2\times 3\times 3\times 7$$
$$924=(2\times 2)\times 3\times 7\times 11$$

We see that (2×2) is common, and 3 is common, and 7 is common to all the numbers as a divisor; therefore (2×2×3×7), or 84, is the G. C. D.

If the young student has difficulty in seeing this, he will find it helpful to write the factors in this way:

$$672=2\times 2\times 2\times(2\times 2\times 3\times 7)$$
$$672=8\times 84$$
$$504=2\times 3\times(2\times 2\times 3\times 7)$$
$$504=6\times 84$$
$$924=11\times(2\times 2\times 3\times 7)$$
$$924=11\times 84$$

Below it is seen that we may break up the numbers into their *composite* factors and from these find the G. C. D.

$$225=15\times 15$$
$$150=10\times 15$$
$$375=25\times 15$$

15 is common, and there is the common factor 5 in 15, 10 and 25. So we know that 75 is the G. C. D. and we see:

$$225=3\times 75$$
$$150=2\times 75$$
$$375=5\times 75$$

We may find the common prime factors in this way:

5	225	150	375
5	45	30	75
3	9	6	15
	3	2	5

5, 5 and 3 are the common divisors, and their product, 5×5×3, or 75, is the G. C. D.

When numbers are *prime to each other,* their G. C. D. is 1; in other words, they have no G. C. D.; for example 7, 20 and 9.

When the factors of several numbers cannot be found at sight, nor by using tests for divisibility of numbers, the following method is used for finding the G. C. D.:

Find the G. C. D. of 4633, 697 and 943.

(a)
$$\begin{array}{r} 6 \\ 697\overline{)4633} \\ 4182 \quad 1 \\ \overline{451\,)697} \\ 451 \quad 1 \\ \overline{246\,)451} \\ 246 \quad 1 \\ \overline{205\,)246} \\ 205 \quad 5 \\ \overline{41\,)205} \\ 205 \\ \overline{\quad} \end{array}$$

(b)
$$\begin{array}{r} 23 \\ 41\overline{)943} \\ 82 \\ \overline{123} \\ 123 \\ \overline{\quad} \end{array}$$

41 is the G. C. D. of 4633, 697 and 943.

GREAT FALLS, MONT., noted for its great smelting works, is situated a little northwest of the geographical center of the state, in Cascade County, of which it is the county seat, and on the Missouri River. Helena is ninety-nine miles southwest; Butte, also southwest, is 173 miles distant; and Billings is 235 miles southeast. The Great Northern Railway, built to the city in 1887, and the Chicago, Milwaukee & Saint Paul, constructed to this point in 1913, provide transportation facilities. The city was settled in 1883, was incorporated in 1887 and named for the great falls of the Missouri River, which at this point have a total descent of 500 feet. Its population, chiefly American, was 13,948 in 1910, giving the city second rank in the state (after Butte).

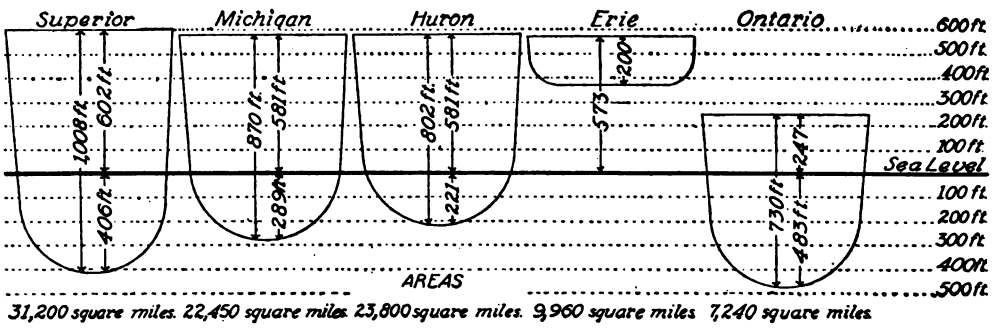
Great Falls is an attractive city, with wide, shaded streets and a park system covering 640 acres. It is located in a territory famous for scenic beauty, which is productive as well as picturesque. Gold, silver, copper, lead, iron, bituminous coal and sandstone are found in abundance; upon these resources depend the leading industries of the city. The smelting works of one mining company alone employ 1,250 people, the monthly pay roll amounting to between $125,000 and $150,000. A remarkable structure in connection with the smelting industry is a smokestack, claimed to be the largest in the world. It stands on a hill, and rises 506 feet above the foundation, its height being exceeded only by two buildings in New York City, the Washington Monument and the Eiffel Tower. The immense dam at Black Eagle Falls furnishes abundant water power for manufacturing purposes, and the number of flour and oatmeal mills, beet-sugar and canning factories suggests the agricultural wealth of the vicinity; the yield of alfalfa is most

important. The city is also a distributing center, and is an important shipping point for wool.

The most notable among a number of handsome modern buildings are the Federal building, constructed in 1912 at a cost of $237,000; the Rainbow Hotel, erected in 1910; the Park Hotel, built in 1915, and a $150,000 Y. M. C. A. building. Besides these the city has the Cascade County courthouse and the passenger stations of the Great Northern and the Chicago, Milwaukee & Saint Paul railways. Ursuline Academy, a business college and a Carnegie Library supplement the public school system. A.J.B.

GREAT KANAWHA, *ka naw' wa,* an important tributary of the Ohio River, and one of the chief commercial waterways of the state of West Virginia. It rises in North Carolina, between the Blue Ridge and the Iron mountains. It is known as the *New River* in North Carolina, from which it flows in a northeasterly direction through part of Virginia and West Virginia, and after traversing a portion of the Alleghany Mountains joins the Ohio River at Point Pleasant. Its principal tributary is the Gauley River, which it receives in Fayette County, West Virginia. The river is navigable from the Ohio to within a few miles of the mouth of the Gauley River, a distance of about 100 miles, and carries much local commerce. Its total length is 450 miles. It flows through thriving districts, the principal city on its banks being Charleston, the capital of West Virginia.

GREAT LAKES, The, five great inland seas of North America, surpassing in area any other series of fresh-water lakes in the world and comprising one of the most important commercial waterways on the globe. They are known as Lakes Superior, Michigan, Huron, Erie and Ontario. The small Lake Saint Clair lies between Huron and Erie, but its size renders it too insignificant to be classed among the "great" lakes. With the exception of Lake Michigan, which is entirely within the United States, they lie between that country on the south and the Dominion of Canada on the north, and form the headwaters of the Saint Lawrence River system. By this stream they are drained into the Atlantic Ocean. The deepest channel of the lakes forms the boundary line between the United States and Canada. The great valley in which they lie is situated on the southern slope of the Height of Land, which extends from ocean to ocean across the North American continent; the land to the north of the rim of their basin slopes toward Hudson Bay, and that to the south toward the Gulf of Mexico.



THE GREAT LAKES
Elevations above sea level, total depths and areas.

Size and Elevation. The Great Lakes have a combined area of about 94,000 square miles, which is more than 27,000 square miles in excess of the total area of the six New England states and a little less than that of Oregon. Their area is about one thirty-ninth that of the Dominion of Canada, and nearly one-seventh that of the province of Quebec. Rhode Island, the smallest state in the Union, could be placed on this area seventy-five times, and there would still be over 1,000 square miles to spare. The area of England, Scotland and Wales combined is not quite as great as that of these five fresh-water seas. Lake Superior, the largest, is a little smaller than Maine and a little larger than South Carolina. Next in size is Lake Huron, which is almost as large as West Virginia. Lake Michigan has an area equal to that of Maryland, Massachusetts and Delaware combined. Then comes Lake Erie, the most shallow of the five, which is about the size of Vermont. Lake

MAP OF THE GREAT LAKES

The largest cities on the lakes, and smaller towns with important steamer lines, are shown. For locations of the international boundary, see maps with the articles on the individual lakes.

Ontario, the smallest, is not quite as large as New Jersey. The elevation of the lakes varies from about 600 feet in Lake Superior to 247 feet in Lake Ontario, the most decided drop being between Lakes Erie and Ontario, where there is a descent of 326 feet. The accompanying maps show their relative positions, their areas, their depths and their heights above sea level. In addition, each of these lakes is described in these volumes under its title.

A Journey on the Lakes. The traveler on a steamer making the trip between Duluth, at the head of Lake Superior, and the Canadian city of Kingston, Ontario, at the foot of Lake Ontario, will enjoy a most interesting journey of 1,245 miles. When the boat reaches the eastern end of Lake Superior to make the passage into Lake Huron, it will encounter the dashing rapids of the Saint Mary's River, the stream connecting the two lakes. From the upper lake to the river there is a drop of about twenty feet. Navigation there would be impossible were it not for the magnificent system of canal locks constructed around the rapids by the American and Canadian governments (see SAULT SAINTE MARIE CANAL). On the Canadian side there is one lock, and on the American side three, the third of which was opened to navigation in October, 1914. A fourth is now under construction.

Through the locks the boat steams out on the quiet waters of the Saint Mary's River, passing by its green and wooded banks for a distance of fifty miles until Lake Huron is reached. Numerous vessels are seen along the course; of these there are none more interesting than the enormous steel boats whose long, boxlike holds are filled with vast quantities of grain and ore from the northwest. The largest of these carry 10,000 tons. They offer a decided contrast in appearance and use to the magnificent passenger steamers, hotels on the water, which give thousands of tourists every summer a taste of life on the sea.

From Lake Huron the boat passes through the Saint Clair River, Lake Saint Clair and the Detroit River, into Lake Erie. The greatest descent of the entire trip is reached at the eastern end of Lake Erie, for the drop from that body of water into Lake Ontario is more than fifteen times as great as that at the rapids of the Saint Mary's. Here are located the famous falls of the Niagara River (see NIAGARA FALLS AND RIVER), and to overcome this obstruction to navigation the Canadian government has built, several miles west of the

Niagara, the Welland Ship Canal (see WELLAND CANAL). Should the traveler desire, he could continue his journey to the Atlantic Ocean by way of the Saint Lawrence River. Passenger boats often make the trip down the rapids of that great stream, but freight is carried through canals that have been built around the rapids. Buffalo, south of Niagara Falls, is connected with Albany, N. Y., by the famous Erie Canal (which see), and the Canadian government is now building a canal from Lake Saint Clair to Lake Erie.

The Great Lakes offer to the summer tourist trips of great variety and interest, and there have been built along their shores numerous thriving resorts. The lakes are diversified by many beautiful bays and islands, famous among which are Georgian Bay, an arm of Lake Huron, and Mackinac Island, at the northwest extremity of that lake (see GEORGIAN BAY; MACKINAC ISLAND).

The Great Lakes Commerce. The Great Lakes form a highway of immense commercial importance. On their waters may be found one-half the tonnage in the United States merchant marine, and every year there passes through the Detroit River a greater tonnage than that of the foreign boats which enter and clear in the ports of both the Atlantic and Pacific coasts. The shipping through the Sault Sainte Marie Canal exceeds that through the Suez Canal, the annual tonnage being about 58,000,000. The bulk of the freight carried on the lakes consists of iron ore, coal, lumber, grain, flour, package freight and copper. It is generally admitted that the development of the great ore deposits on the shores of Lake Superior, near Duluth, and in Northern Michigan and Wisconsin, is due to the cheap and convenient means of transportation furnished by the Great Lakes. These waters are also important in supplying cheap shipping facilities for the enormous wheat crops of the Canadian Northwest.

Shipbuilding on the lakes has also developed to a remarkable degree within recent years, the increase of steel construction showing a percentage advancement in excess of that of any of the great maritime nations since the early period of steel ship-construction. Some of the finest vessels afloat are built in the Great Lakes shipbuilding yards. These great inland seas give a shore line to eight states of the Union, having a combined population of over one-third that of the entire country. Each year more than 24,000 vessels enter the six principal lake ports—Chicago, Buffalo, Cleveland, Milwaukee, Detroit and Duluth.

A noble fountain symbolizing the five Great Lakes, designed by Lorado Taft, stands on the southern side of the Art Institute, Chicago. See page 1311.

GREAT SALT LAKE, one of the natural wonders of the world, lying in a region of great scenic beauty, in the northwestern part of the state of Utah. It is seventy-five miles long and about fifty miles wide, and covers an area of about 1,750 square miles, nearly one and one-half times the size of Rhode Island. This area varies, however. In winter more water comes to it and there is less evaporation. The amount of yearly rainfall or snowfall and the amount of water of tributary streams used for irrigation also affect the area.

GREAT SALT LAKE
The route of the Lucin Cut-off is shown. The small black area in the corner map gives the location of the lake in the state.

One of the most remarkable features about the lake is that though it has no connection with any sea or ocean, and is formed and maintained by rivers of fresh water, it is a sea of salt, 4,218 feet above sea level. It is five and a half times as salty as the oceans of the world. At the present rate of use of salt it has been estimated that there is enough salt in solution in the waters of this lake to supply the United States for nearly a thousand years.

The chief rivers feeding Great Salt Lake are the Jordan, the Weber and the Bear. The latter is 400 miles long, but its mouth is only ninety miles from its source. Those waters contain so little salt it cannot be discovered by taste. But Great Salt Lake has no outlet, so the waters brought to it evaporate and the solid matters which were dissolved in them remain. That is why the lake is salt.

Within this lake are several islands which, like its shores, are whitened by salt. On these, immense flocks of gulls, ducks, geese and pelicans breed each year. On Antelope Island, the largest, alfalfa is being cultivated and cattle are raised. There are no fish in the waters, but the lake contains a small brine shrimp. A tiny fly also lives there while it is still a grub.

A celebrated pleasure resort, Saltair, is built 4,000 feet out in the lake. Tourists enjoy bathing in the clear salt water, which is so dense with dissolved mineral matter it is impossible for a person to sink. Another point of interest is the railroad crossing the center of the lake, called the Lucin Cutoff, connecting Lucin, at the west, with Ogden, 103 miles to the east. Twelve miles of the road across the lake is on a trestle and the rest is on a solid foundation built upon beds of salt.

About 40,000 tons of salt are gathered from the lake each year, by drawing the water off into shallow ponds and evaporating it by the heat of the sun. M.S.

GREAT SLAVE LAKE, a large lake in the northwest of Canada, covering an area of 10,719 square miles, a water area more than a thousand square miles larger than Massachusetts and Rhode Island combined, and one and a half times the size of Lake Ontario. It lies about 250 miles south of the Arctic Cirble, 300 miles southeast of Great Bear Lake and 500 miles north of Edmonton, Alberta. The shore line is very irregular, with rugged and barren shores on the north, and well-wooded slopes on the south and west. The water is deep, clear and cold, and the surface of the lake is dotted with numerous islands. Fish of many varieties abound. The lake is frozen for more than half the year, but is navigable from July to October, when great quantities of lumber are shipped from the western shores. The lake is a favorite resort of trappers, and large numbers of fur-bearing animals are caught in the vicinity.

LOCATION MAP

Great Slave Lake is a part of the Mackenzie system, the greatest river system in Canada. Though the lake receives from the north the surplus waters of Lake Aylmer and several smaller bodies, its chief source of supply is the Slave River, which brings from the south the surplus waters of the Peace River and the Athabaska system. From Great Slave Lake in turn issues the Mackenzie (which see).

GREAT SLAVE RIVER, a river of Canada which flows from Alberta into the North West Territories, carrying the surplus waters of Athabaska Lake northwestward into Great Slave Lake. Soon after it leaves Athabaska Lake it has poured into it from the west the floods of the Peace River. Its total length is about 300 miles, and through all but thirteen miles of its course it is navigable for steamers, except in the icebound winter months. In its lower course it flows through a valley which rivals the Peace River valley for fertility.

GREAT WALL OF CHINA. See CHINA, subtitle *History,* where an illustration appears.

GREBE, *greeb,* one of a curious family of water birds which acquires the art of swimming the day it is hatched. It is about nineteen inches long, and the neck is of dark red which changes later to gray or silvery white. The grebe has short wings and a heavy body and flies with its feet far apart. The toes are bordered by a membrane, and on land, where the bird seldom ventures, it appears awkward and really out of its element. There are about thirty species of the red-necked grebe found in North America, but other species are scattered all over the world where there is an average temperature.

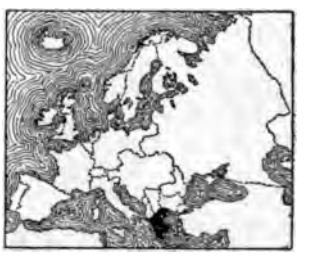
THE GREBE

The ingenious grebe builds its nest of grass and rushes and packs it with moss until almost water-tight, and then attaches it by means of mud to tufts of grass, or allows it to drift with the tide in some marshy inlet. About five chalky-white eggs are laid and covered over with vegetable matter when the bird leaves the nest. The male bird keeps close at hand after the young are hatched, and he supplies the nestlings with small fish and insects. If danger threatens the grebe dives quickly, and it is very expert and graceful in swimming. The crested grebe, hell diver, pied-billed and spirit duck are the most common species.

The grebe is hunted for its skin. This is in demand for muff coverings, hat ornaments, and the like, for the plumage of the bird is heavy and the down is silken in its smoothness.

GREECE, a kingdom of Europe which occupies the easternmost of the southern peninsulas of the continent. It does not rank among the great powers, but it has a heritage more glorious than that of any other nation; for in the days when the ancestors of the present-day English, Germans and French were still living in barbarism, Greece was the one great country of the world. Its art, its literature, its government were very highly developed—so highly that all the modern countries in all the centuries since have been able to make little advance upon them. When Greece is referred to, most people think not of present-day Greece, with its strictly modern problems to meet, but of ancient Greece with its beautiful buildings, its inspired poets, sculptors and architects, and its wars. The writings of the modern authors of Greece have never replaced those of Homer, Aeschylus or Euripides; its most magnificent modern structures have never rivalled the Parthenon, the Erectheum or the Theseum.

After the Balkan war of 1912-1913, the area of Greece was 41,933 square miles, or a hundred square miles smaller than Tennessee. This was a large increase over its previous area, which had been but 25,000 square miles, or thereabouts, and the population was also increased from about 2,600,000 to 4,400,000. Any statement of the area of Greece includes that of the numerous islands of the Aegean Sea, which are industrially as well as historically closely bound up with the mainland. Had it not been for these "stepping stones" from Greece eastward to Asia Minor, the Greeks would hardly have been tempted so early to cross the Aegean and found their colonies on the eastern shore (see subtitle *History,* below). These colonies had a very great influence on the history of Greece, for they proved a strong temptation to the kings of Persia, and thus involved Athens and its allied cities in their epoch-making struggle with that country.



LOCATION MAP

Fair Greece! sad relic of departed worth!
Immortal, though no more; though fallen, great!

Ancient Greece

It is common to speak of Greece as a *country,* but it was not such in ancient days, in the sense in which England or the United States is to-day. It consisted, during the greater part of its history, of a number of little independent states, which were frequently struggling with each other for supremacy. The geography of the peninsula accounted in large measure for this; tall mountains with their steep valleys divided the little plains on which the various settlements had grown up, and these prevented that free intercourse which might have resulted in a federation or empire. Very often, when the term *Greek* is used in connection with art or civilization, it is *Athenian* which is meant, for it was Athens which conferred upon Greece much of its glory. The distinction, however, is no longer sharply made.

The People. The inhabitants of this wonderful land of myth and history were called by the Romans *Greeks,* but their name for themselves has always been *Hellenes,* a certain mysterious Hellen having been their ancestor, according to the popular legend. Related though they held themselves to be, there were four well-defined Hellenic families or tribes, the *Achaeans,* the *Aeolians,* the *Ionians* and the *Dorians* (which see). The two last-named

families were most important in historic times. All of these Hellenes had an intense pride in their race and their ancestry, and looked with a pitying contempt upon the *barbarians*, as they called all non-Greek people.

It is difficult to make general statements about the ancient Greeks, so widely did they differ among themselves in certain respects. It may be recorded, however, that the Athenians and all their neighbors in Attica were quick and bright, while the Boeotians were so slow and dull-witted that their name has become proverbial for stupid people. Again, the Athenians loved luxury, and they embellished their homes and their city, but the Spartans reduced life to its very simplest terms and cared only for that which made for perfect physical health (see ATHENS; SPARTA). But of practically all the ancient Greeks it may be said that they loved beauty with an intensity so great that anything ugly caused them positive pain. The modern proverbs that "Beauty is only skin deep" and "Handsome is as handsome does" would have found no response in the Greek mind, for to them goodness without beauty was a thing difficult to conceive. It was because of this love of the beautiful that the Greeks became the supreme architects and sculptors of the world (see ARCHITECTURE; SCULPTURE), and that their poets stand among the greatest of all time (see HOMER; SAPPHO).

Religion. The Greeks were a religious people by instinct, and in early times their veneration for the gods was profound and sincere. The Apostle Paul, in his sermon on Mars Hill, declared, "Ye men of Athens, I perceive that in all things ye are too superstitious," or as later translations give it, "very religious." Of late years much attention has been paid to the religion of the ancient Greeks; scholars study it because of the light it throws on history and on Greek life, and general readers find it fascinating because of its story quality. For these people with the wonderful imagination wove about their gods and heroes countless tales which still keep the freshness of those early days in which they were first told (see MYTHOLOGY, subheads *Greek* and *Roman*). It is impossible to consider the literature or the art of Greece without reference to its mythology, for the poet sang his loftiest hymns to the gods, or told of their adventures in stately verse; the architect reared exquisite temples to them, their power and beneficence being his inspiration; and the sculptor carved them, from the least to the greatest, in marble. The great Greek festivals, too, grew out of the worship of the gods, and both tragedy and comedy had their origin in religious observances.

To be sure, the Greek gods were not such beings as a modern worshiper could bow down to; they were jealous, lustful and revengeful, moved in all things by their own desires; but they were always ready to reward real homage paid to them.

Education. The Spartans had worked out for themselves a system of education which differed from every other system in Greece, as well as from those of modern states. Parents had not first claim on their children; these belonged to the state. Baby boys were examined by a Council of Elders, and if they were defective or weakly they were placed on the open hillside to die. The result was a race which closely attained to physical perfection. At the age of seven the boys were turned over to public officers, and their education was begun. They did not learn to read and write, or to care for literature; they were not encouraged to become orators, or even to converse, for practically all of their education was physical. To bear intense pain without flinching, to endure privation, to fight, to run, to wrestle—all of these the Spartan boy was carefully taught, for Sparta was a nation of warriors and cared for no citizens who could not strengthen the military arm.

In Athens and the remaining Greek states, on the other hand, a far more rounded system of education prevailed. Many private schools existed, and in these the boys were taught gymnastics, reading, writing, arithmetic, music, and, in their later years, rhetoric and philosophy. Probably the world has never seen a better-educated class of men than were the Athenians.

Education, in every Greek state, was all for the men. Although the women were not abused, they by no means held such a dignified position in their world as modern women have gained. They were not closely confined, as in Mohammedan countries to-day, but they were not allowed to appear frequently in public, or even to mingle with mixed gatherings in their own homes. If it be true, as so often said, that "a civilization can rise no higher than the status of its women," this was a serious fault in Greek culture.

Slavery. This was the great curse of Greece. Incredible as it may seem, there were many more slaves in the larger industrial centers of Greece than freemen, nor were the slaves

always of inferior birth or intelligence. All captives of war were made slaves, and many debtors became the chattels of their creditors. In general, the slaves were fairly well treated, and sometimes a man of decided intelligence, like Aesop (see AESOP'S FABLES, subhead *Aesop*), held a position of honor in the household. This was not true at Sparta, where most of the serfs were terribly oppressed, and where there was constant fear of their revolting.

History. The history of the ancient Greeks is told in the heading *History*, below. The detailed stories of ATHENS and SPARTA are related under those titles.

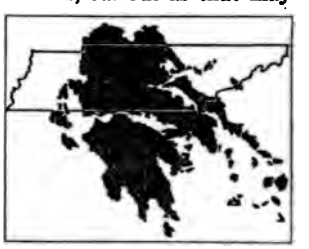
Modern Greece

The People. The English poet Byron, who loved Greece better than his native land, wrote sadly,

> The isles of Greece, the isles of Greece,
> Where burning Sappho loved and sung;
> Where grew the arts of war and peace,
> Where Delos rose, and Phoebus sprung!
> Eternal summer gilds them yet,
> But all except their sun is set.

Anyone who takes up the study of modern Greece after studying its ancient history feels a touch of the same sadness. When the Greeks lost their freedom and became subject to Rome in 146 B. C., they seemed to lose many of their best qualities also. That independence and vigor which seem so characteristic of dwellers in mountainous country disappeared, and the Greeks became a fawning, treacherous people, utterly untrustworthy in business dealings. The old love for beauty degenerated to a large extent into a fondness for display; and the contempt for manual labor, which was permissible enough when there was a large body of slaves, manifested itself in an overwhelming desire for easy official positions. Since Greece threw off the yoke of Turkey, however, there has been a remarkable change for the better, and under the influence of the freer institutions the higher qualities of the ancient Greeks are being reborn in these modern descendants. The present population of Greece has a very small foreign element, and the Albanians, who make up by far the largest part of the non-Greek population, are gradually becoming absorbed. Over 300,000 Greeks have within the last generation emigrated to the United States, and the money which they send or carry back to their old homes has been a real asset to the country.

Industries. Greece is primarily an agricultural country, and about one-fourth of the land is under cultivation. The farmer is confronted with many drawbacks, however, for while the climate is subtropical and would make possible the growing of many kinds of crops, the soil is thin and the rainfall is very light in the summer months. Because there is more rain in the western mountains than on the eastern plains, the farms are more numerous among the mountains, curious as that may seem. Marshy stretches are being drained and dry places irrigated, and thus the cultivable area is being steadily increased.



COMPARATIVE AREAS

Chief Crops. The most distinctive crop, as well as one of the most important, is the small, seedless grape known as the *currant*, because it is most successfully grown in the neighborhood of Corinth. This is not the little tart fruit known in America as the currant, but a true grape, which is either dried or made into wine of an inferior quality. All over Greece is to be seen the dusty gray-green of the olive trees which for so many centuries have been of importance in the life of Greek farmers. So important are they that the Turks during their domination could think of no better way of punishing insurrection than by cutting down the olive trees. To-day there are about 15,000,000 trees in the country, and each tree produces nearly ten pounds of oil annually.

Wheat, too, is one of the chief crops, but with their primitive methods the peasants are not able to raise enough to supply the home demand, and the cereal is imported in large quantities. Since vegetables form the staple diet of the people, huge gardens are numerous, and in every grassy place are to be seen herds of sheep and goats, from whose milk cheese is made. Almost no butter is used, olive oil largely taking its place.

Mining. Greece is not rich in minerals, and those which it has are not easily mined because of the entire absence of coal. Near Athens there are lead mines of large size, and from the ore considerable silver is taken. Heaps of

how that the ancients worked this field, t was done so poorly that it has paid rn investors to rework the slag. Most us of all the mineral products of Greece e marble from Pentelicus and the island aros, which has been known since the sculptors of antiquity carved their matchtatues.

ier *Industries.* The manufactures of ce are of very little importance. Cloth carpets are woven in the homes of the nts, and there are occasional silk mills, mills or machine shops, but that is prac-y the extent of manufacturing. Nor does em possible, considering the absence of and of rivers to furnish water power, that ufactures can increase largely. Shipbuild-owever, is carried on in all the ports, for Greeks are among the world's most en-astic seafarers, and large fleets of pri-y owned ships constantly sail the Aegean.

nsportation and Commerce. To the ks the natural means of transportation is ea and not the railroads, for few places e entire country are more than forty miles the coast. Railroads, therefore, are few, n the entire country aggregate less than miles. But ships, as stated above, are rous, and by means of them easy com-cation is maintained with the rest of ce. It was believed that the canal across sthmus of Corinth, completed in 1893, l be a wonderful help to commerce, but not been much used because of its nar-ss and the strong currents which flow gh it (see CORINTH).

e commerce of Greece is not large, nting in a year to less than $60,000,000. The imports slightly overbalance the exports, and Great Britain has the larger part of the import and the export trade. Currants form about one-fourth of the exports, and wheat more than that proportion of the imports.

Education and Religion. Though Greece has a system of schools which includes elementary and intermediate departments and a national university at Athens, education is by no means widespread, for the people are slow to avail themselves of their opportunities. The percentage of illiteracy of those over ten years of age is fifty-seven, as compared to 7.7 per cent in the United States and eleven per cent in Canada, but conditions are gradually improving. There is a compulsory education law, but in the country districts it is not well enforced.

There is a state religion—Greek Catholicism or Orthodoxy—and the king is the head of the Church, but complete freedom of worship is allowed. The Holy Synod, a permanent council which meets at Athens, manages the affairs of the Church.

Government. The government of Greece is a constitutional monarchy, the office of king being hereditary. There is but one legislative body, a House of Representatives of 235 members, which is chosen by popular suffrage and is known as the *Boule*. To aid the king in all his executive functions there is a ministry composed of the heads of the six state departments, and any male subject is eligible to any office; but the government is not as democratic as it would seem from this description, for promotion is largely by favor and a disinterested election in which people vote for the candidates whom they believe the country really needs is almost unknown.

Physical Features

re is a very special fitness in bringing iscussions of the geography and the his-of Greece as near together as possible, for wo are closely related. It is impossible to imagine what the history of the coun-ould have been had land communication easier and sea communication been more lt, but it is certain that it would have very different.

stal Peculiarities. The first point that s an observer of the map of Greece is the n character of its coast, and the conse-length of shore line. Gulfs and bays rate far into the land, and the southern f the peninsula, the Peloponnesus (which see), is almost cut off from the northern by the deep gulfs of Corinth and Aegina. Of all the countries of the world, Greece has the largest proportion of coast line to area—nearly 2,500 miles of coast line, or one mile of coast to every ten square miles of surface. Small wonder, then, that the Greeks have been at all times a sea-loving people. Good harbors are not numerous, though there are some excellent ones, notably Piraeus, the seaport of Athens.

Surface and Rivers. In the main, Greece is mountainous, even its islands being but the tops of submerged hills. The Pindus Mountains, running from northwest to southeast almost through the center of the peninsula,

form the watershed. To the west of these there are north and south chains divided by narrow valleys, but to the east there are east and west ranges between which lie the extensive plains which have played the chief part in Greek history. Macedonia, the plains of Thessaly, those of Thebes, of Athens, of Sparta and of Messene were the centers of ancient Greek life, the homes of the famous city-states (see subhead *The City-State,* in HISTORY division, below). Many of the mountains of Greece have special associations: Olympus was the fabled home of the gods; Parnassus, the haunt of Apollo and the Muses; Hymettus produced honey of rare quality, and Pentelicus a beautiful marble. But the mountains are worth visiting aside from their historic associations, for they have a beauty all their own. At places, where the sheer mountain-walls rise from the blue sea toward the bluer sky, the grandeur of the scenery is almost unsurpassed.

Greek rivers, too, are beautiful—rushing mountain torrents which are worthy of the legends the old Greeks wove about them; but they are too rapid for navigation, and are for the most part merely temporary, carrying water only during the rainy season, so that they are not available for irrigation. The Achelous, in the northern part, and the Alpheus, in the Peloponnesus, are the rivers of chief importance.

One of the largest lakes, Copais in Boeotia, has had a bad influence, it is believed, on the people who live near its shores. The Boeotians, in ancient as in modern times, were the slowest witted of all the Greeks, and scientists now contend that this is due to the malaria spread by the mosquitoes which Lake Copais bred. Now the lake has been drained and converted into farm land, and an improvement in the mentality of the Boeotians is looked for with confidence.

History of Greece

Its Beginnings. The very early history of Greece is shrouded in mists, through which only gradually gleams of light begin to break. The very oldest inhabitants of the soil, who were called by the later Greeks *Pelasgians,* were little by little assimilated by these same later Greeks, or *Hellenes,* as they called themselves, who came in from the north. Marvelous tales of the earliest age of history, the so-called Heroic Age, survive—tales of Hercules and Theseus, of the Argonauts and of Perseus, of Troy and of Thebes (all of which see); and recent excavations at Troy, at Mycenae and on the island of Crete have made it clear that this ancient time had a very real civilization, long before the Greeks came into the peninsula from the north.

Greek Middle Age. About 1200 B.C., as nearly as can be known, there began a period which lay between two ages of culture and prosperity, and thus corresponded roughly to the Medieval Age of later Europe. Its characteristic feature was the so-called Dorian migration, a movement of the rude, primitive tribes of the northern fastnesses of Greece south into the Peloponnesus. Chief of these Dorian tribes were the *Laconians,* or *Spartans,* whose main city developed into one of the two great powers of Greece. Before this sweeping wave of Dorians some of the tribes already settled in Greece were crowded out, so they crossed the Aegean into Asia Minor, where they founded those colonies which played so large a part in later Greek history. Several centuries later there was a new era of colonization, and settlements were made in Sicily and in Southern Italy, those in this latter country being so numerous that the name "Great Greece" (*Magna Graecia*) was applied to the southern part of the peninsula.

That this middle period was in no sense a "Dark Ages" must be thoroughly understood. It produced, for one thing, those great epics, the *Iliad* and the *Odyssey* (both described in these volumes), which by celebrating past glories helped to rouse in the Greeks a feeling of nationality, which was not strong enough to prevent interstate conflict but which drew them together when any outside enemy threatened. It also saw the development from the old tribal form of government through monarchy and oligarchy toward democracy, though in no state was democracy actually achieved during this period.

The City-State. During this period there was developed that most typical of all Greek political institutions, the *city-state.* The Greek cities were the elements about which the national history centered; contests between Athens, Sparta, Thebes and the lesser cities fill old Grecian chronicles. They were not, however, such cities as those of the modern world. Each city with its surrounding territory was in effect a nation, very small but entirely self-

"THE GLORY THAT WAS GREECE"

The Acropolis, or Citadel, of Athens
Here were once some of the world's most beautiful buildings

The Erechtheum

The Porch of the Maidens (Caryatides)
Location shown on left of picture above

The Parthenon
Probably the most perfect building ever erected

The Theseum
Well preserved after nearly 2400 years

Temple to Wingless Victory
(Nike Apteros)

governing. Its citizens owed allegiance to no other powers, and it might declare war irrespective of the wishes of any neighboring city. There were other differences also. When historic Athens is spoken of, it is not simply the walled town with its Acropolis and wonderful buildings which is meant, but all Attica with its farms and villages. All the dwellers throughout such a region might have a national pride as Greeks, a sentiment of loyalty toward Greece as a whole, but their intense patriotism was toward the city: they were, for example, Athenians or Spartans first, and then Greeks. This must be understood, that it may be clear why Greece throughout antiquity was never one nation.

The Period of Glory. By the close of the sixth century B. C. the powerful city-states had developed fully, each in its own field. Sparta was a great military power, Corinth was commercially supreme, and Athens was beginning to be the center of the intellectual and artistic life (see articles on those cities). Great political advance had also been made. Draco had drawn up a code of laws at Athens, and Solon and Clisthenes had broken the rule of the old land-holding nobles and organized the first democratic government of the world. But it was war which brought Greece to the height of its glory—war with a great foreign power.

The Persian Wars. The Ionian cities which had been planted in Asia Minor had kept up their connection with the mother country, but they had come in 546 B. C. by conquest under the rule of Persia. So severe was this rule that the cities revolted in 499 B. C., and Athens sent them aid in their unsuccessful insurrection. For this act Darius, the Persian king, decided that Athens must be punished. So determined was he not to let his wrath die down that he commanded a servant to repeat to him three times each day, "Master, remember the Athenians."

In 492 B. C., therefore, Darius dispatched an army into Greece under his son-in-law, Mardonius, but a storm off Mount Athos destroyed the Persian fleet, and the army suffered so severely during its progress through Thrace that the expedition was abandoned. Unappeased, Darius sent out another force two years later, but this army encountered the Athenians on the plain of Marathon (which see) and was overwhelmingly defeated. This victory, one of the "fifteen decisive battles" of the world, gave confidence to the Greeks, and raised Athens to the position of acknowledged headship among the Greek states. See FIFTEEN DECISIVE BATTLES.

Themistocles (which see), realizing that Persia had not yet given up the struggle, persuaded the Athenians to increase their navy, on which he felt Greece must of necessity depend in any future conflict. Events proved his wisdom, for in 480 B. C. Xerxes, the son of Darius, undertook to carry to success his father's project. With a land and naval force which the ancients estimated at more than 2,000,000, but which authorities believe to have included only about 300,000 actual warriors, he crossed the Hellespont and marched through Thrace and Macedonia. Laying aside their jealousy, Sparta and Athens summoned a congress of the states at Corinth, and a number of the cities were represented and agreed to help in the struggle.

In a series of battles which included the heroic, but for the Greeks, disastrous stand at Thermopylae (which see), the great naval engagement at Salamis (which see), and the battle at Plataea, Xerxes attempted to crush the Greeks, but their heroism and patriotism were in the end triumphant, and the Persian hosts were compelled to withdraw to Asia.

For half a century after the close of the Persian wars Greece had peace, and the city-states had leisure to develop their differing types of civilization (see ATHENS; SPARTA). Because of its naval leadership during the war, Athens was the dominating power in the peninsula, and reached a height at which the world still marvels. Its democratic ideas were widely adopted by the other states, but Sparta held firmly to its old aristocratic government.

Period of Decline. The old rivalry between Athens and Sparta, which had been almost forgotten during the Persian wars, flamed up again when there was no great need for harmony, and in 431 B. C. Sparta found in the relation of Athens to its allied states an occasion for war. In the resulting struggle, known as the *Peloponnesian War,* Pericles, the great Athenian statesman, held his people back from land battles, in which they were no match for the Spartans, but attempted to destroy the commerce of the Peloponnesus and to gain possession of the coast towns and islands. Sparta, in the meantime, did its best to induce the colonies of Athens to revolt, and sent expeditions to ravage Attica. The Athenian plan worked well until a terrible plague broke out in the city and carried off at least a fourth of the population. Pericles was one of the

victims, and there was no one who could take his place. For twenty-five years the struggle went on, Athens almost constantly losing ground, but determined not to give up. The expedition to Sicily in 415 B. C. under Alcibiades (which see) and Nicias turned out so disastrously that Sparta thought its victory was won, but the Athenians held out until 404 B. C., when they were compelled to accept the most humiliating terms of peace.

Sparta was now the head of the Grecian states, and it proved such a hard master that at length the other states revolted, under the leadership of Thebes (see EPAMINONDAS). The Spartans were defeated at Leuctra in 371 B. C., and until 362 B. C., when Epaminondas was killed, Thebes was the foremost state in Greece.

Period of Foreign Rule. To the north of Greece a strong ruler, Philip of Macedon, had firmly established his kingdom, and in the disturbed conditions in which the Greek states found themselves, he was able gradually to extend his power southward. Demosthenes at Athens thundered against him in his *Philippics*, and at length the Greeks roused themselves to resist the invasions. At Chaeronea in Boeotia they were defeated in 338 B. C., and Greece became a part of the Macedonian Empire. The Macedonians were themselves a Hellenic people, and the Greeks were not brought into entire subjection because their intellectual superiority was clearly recognized by Philip and by his greater son, Alexander the Great.

After the death of Alexander the Greek states had a troubled existence, struggling constantly but vainly to throw off the yoke of Macedonia, but in 146 B. C. they passed under the rule of another conqueror. With the capture and burning of Corinth in that year Rome became supreme over the Greek states, and for a time they prospered under a mild and just government. A revolt in 22 B. C. brought down on them the vengeance of Rome, and several of the great cities were practically destroyed. From that destruction they never entirely recovered, though under the Roman emperors Greece regained a certain prosperity and was recognized as an intellectual center. Christianity made rapid progress, and the picturesque paganism gradually died out. New importance came to the province when, in A. D. 330, Constantine the Great moved his capital to the old city of Byzantium, which he rechristened Constantinople (see CONSTANTINE). In 395 the Roman Empire was divided into the Eastern and the Western empires, and Greece was a part of the former until the fall of Constantinople in 1453 (see BYZANTINE EMPIRE) gave the country to the Turks.

Under the Turkish rule, which lasted almost four centuries, the Greeks sank into a pitiable condition, but their devotion to their Church and their interest in the local self-government that was allowed them helped to preserve their feeling of nationality. In the early years of the nineteenth century this feeling seemed to grow more intense, and in 1821 a war for independence broke out under Alexander Ypsilanti. To check the revolt the Turks resorted to their usual weapons, massacre and wholesale execution, nor were the Greeks much more humane in their methods. Champions of the determined people sprang up on all sides, the English poet Byron being the most notable, and in 1827 England, Russia and France gave Greece their open support. The great naval Battle of Navarino, fought on October 20, 1827, resulted in the complete defeat of the Turkish fleet, and Greece became an independent kingdom.

The Modern Kingdom. In 1832 Otto of Bavaria was made king, and while his rule was far from despotic, the Greeks were much disappointed because he did not proclaim a constitution as they had expected him to do. He was forced in 1843 to yield to the strong popular demand, and a constitution went into effect the next year. This did not lessen Otto's unpopularity, however, and in 1862 he was compelled to abdicate, largely because he had not taken an active part in the Crimean War and won for Greece an increase in territory. Prince George of Denmark was chosen by the national assembly as king, and in 1863 he began his reign, which continued for half a century. In 864 England gave up to Greece the Ionian Islands, and after the Congress of Berlin in 1878 the country was further enlarged by the accession of Thessaly.

In January, 1897, Greece went to the aid of the Christians in Crete who were rebelling against Turkish rule and seeking annexation to Greece, and the result was complete defeat for the Greeks. They were compelled to pay a huge indemnity to Turkey, and to give up their claims on Crete, which did not come under the Greek flag until 1913, after the Balkan wars. This struggle broke out in 1912 between Turkey and the Balkan states, and Greece profited largely by the success of the

latter, gaining not only Crete but many other islands in the Aegean which had been a part of historic Greece, and much of Macedonia besides. The cost was great, both in money and in men, and the exhaustion which resulted had much to do with the attitude of Greece during the War of the Nations.

On March 18, 1913, while on a tour of inspection, King George was assassinated at Saloniki, and his son, Constantine I, came to the throne. The country was confronted with a serious problem on the outbreak of the War of the Nations in 1914, but declared at once its absolute neutrality.

The position of Greece in connection with the war was exceedingly embarrassing. The queen is a sister of the German emperor, and the royal family therefore leaned strongly towards the cause of the central empires, Germany and Austria. The majority of the people were in sympathy with the entente allies; this was but natural, because France and England had by treaty guaranteed protection to Greece against foreign invasion.

When Serbia was overwhelmed by the Teutonic forces in 1916 that unhappy little country looked to Greece for support, for after the Balkan wars the latter had pledged its military strength to support the former against alien enemies. However, Greece ignored the plight of Serbia, and there were strong indications that King Constantine would resist no pressure that Germans might bring to bear upon him. Internal affairs grew serious, for a strong element of the people, headed by former Premier Venizelos, resisted what was termed a disregard of the will of the people, and Venizelos and his followers revolted. They retired to a neighboring island and organized a provincial government, ready to strike against the king should the turn of events make such an act appear necessary.

The military forces of the entente, by right assumed because of treaty obligations, took extreme measures to insure the continued neutrality of Greece. A small force of men was landed from the warships, and the navies blockaded the coasts. A demand was made upon the king to demobilize his army and to deliver certain artillery to the care of the allies, that the military arm of the kingdom might be weakened to the point where active participation in the war would be impossible. The effect of this action and the further relation of the country to the war are related in the article WAR OF THE NATIONS. W.L.W.

Consult Grote's *History of Greece;* Tennent's *History of Modern Greece* (146 B.C.-A.D. 1820); Martin's *Greece of the Twentieth Century.*

Related Subjects. The following articles in these volumes will throw much light on the history and life of Greece. The articles on ARCHITECTURE and SCULPTURE should also be consulted. For the literary references relating to the country, see DRAMA, POETRY, etc.

CITIES AND TOWNS

Agrigentum	Missolonghi
Athens	Mycenae
Corinth	Piraeus
Delphi	Sparta
Marathon	Thebes

DIVISIONS

Arcadia	Macedonia
Attica	Messenia
Boeotia	Peloponnesus
Epirus	Thessaly
Laconia	Thrace

HISTORY

Actium	Helots
Alcibiades	Hipparchus
Alexander the Great	Leonidas
Arbela	Lysander
Archon	Miltiades
Aristides	Nicias
Balkan Wars	Oracles
Bozzaris, Marco	Ostracism
Byzantine Empire	Otto I
Cimon	Pelopidas
City States	Pericles
Civilization	Phocion
Clisthenes	Pyrrhus
Codrus	Solon
Constantine I	Themistocles
Darius	Thirty Tyrants
Demosthenes	Troy
Draco	Venizelos, Eleutherios
Epaminondas	Xerxes
George I	

ISLANDS

Aegina	Ionian Islands
Crete	Ithaca
Cyclades	Melos
Delos	Salamis
Euboea	Scilly Islands

PEOPLES

Achaeans	Dorians
Aeolians	Ionians

PHYSICAL FEATURES

Acheron	Olympus
Aganippe	Parnassus
Helicon	Tempe, Vale of
Mars Hill	Thermopylae
Olympia	

UNCLASSIFIED

Acropolis	Mysteries
Alexandrian Age	Mythology
Areopagus	Nemean Games
Festivals	Olympian Games
Greek Literature	Pythian Games
Isthmian Games	Stadium

OUTLINE AND QUESTIONS ON GREECE

Outline

I. Location and Size

(1) Easternmost of European peninsulas
(2) Surrounding waters and islands
(3) Size after 1913—45,000 square miles

II. Physical Features

(1) Coast line
  (a) Longest in proportion to area of any country
(2) Surface characteristics
  (a) Largely mountainous
    1. Effects of this fact on history
(3) Waters
  (a) Turbulent character of rivers
  (b) Malarial lake of Boeotia

III. Ancient Greece

(1) Lack of national unity
  (a) Effect of geography in this
(2) The people
  (a) Four tribes
  (b) Love for beauty
    1. Great works of art
  (c) Religion or mythology
  (d) Education
    1. Athenian standard
    2. Spartan standard
  (e) Slavery

IV. Modern Greece

(1) The people
  (a) Change for the worse during years of subjection
  (b) Opposite change since independence
(2) Industries
  (a) Agriculture
    1. Currant and olive
    2. Wheat
  (b) Mining
  (c) Unimportant manufactures
(3) Transportation and commerce
(4) Religion, education and government

V. History

(1) Early periods of migration
(2) The wonderful years
  (a) Persian wars
(3) Downfall of Athens
  (a) Peloponnesian War
(4) Subjection to foreign powers
  (a) Macedonia
  (b) Rome
  (c) Turkey
(5) The modern kingdom
  (a) Independence secured in 1827
  (b) Activities of the nineteenth century
  (c) Balkan Wars
  (d) War of the Nations

Questions

Name an ancient Greek slave who became famous. How did he gain his fame?

What geographic cause accounted for the stupidity of one group of the people?

What helped the people to preserve a feeling of nationality during the centuries of Turkish domination?

How did the Spartan ideal in education differ from the Athenian?

If the coast line of the United States were as long in proportion to area as that of Greece, how long would it be?

Why would the proverb "Handsome is as handsome does" have seemed foolish to an ancient Athenian?

Why has not the Corinth Canal been as great an aid to commerce as it was expected to be?

Why does the word *Thermopylae* stir the blood of a Greek?

What did the Greeks call all non-Greeks? What did the word mean?

Why does it seem unlikely that the manufactures will ever increase in importance?

Who took as his watchword "Remember the Athenians," and what did it mean?

How did the geography tend to make of ancient Greece many small countries instead of one large one?

GREEK CHURCH, the religious organization formerly comprised in the Greek, Greco-Roman, or Roman Empire and of countries evangelized from it, which include Russia. Frequently it is called the *Eastern Church* to distinguish it from the Western, the Latin, or the Roman Catholic Church. Its official title is the Holy Orthodox Catholic and Apostolic Church. The Greek Church comprises three branches: the church in the Turkish Empire, the church in Greece and the Russo-Greek Church of the Russian Empire. In point of numbers and historic memories the Orthodox Church in Turkey is the richest. It is ruled by the patriarch of Constantinople, with the subordinate patriarchs of Jerusalem, Antioch and Alexandria, who are the highest officers of the Church. The Greek National Church is governed by a holy synod. There are branches also of this Church in Rumania, Bulgaria and Serbia. The joint Greek Church has a large following in the Church in Russia and uses the old Slavonian tongue in its ritual.

History. The estrangement and separation of the Greek and the Roman Catholic Churches had its beginning in the political division of the Roman Empire and the founding of Constantinople; but it was not until the ninth century that the "great schism," or splitting of the Church into factions, began. Photius, who succeeded Ignatius as patriarch, called a synod in Constantinople in 867 and ruled that the Bishop of Rome, by that time called the Pope, should not be supreme, and denounced as heresy the insertion in the Nicene Creed of the word *filioque,* meaning *and from the Son.* He also denounced the prohibition of priestly marriage. After his death in 891 the churches were reunited until the eleventh century. The final division was that between Pope Leo IX and the patriarch Cerularius in 1054, since which time the Roman Catholics regard the Greeks as outside the Roman Catholic Church, while the Greeks maintain they have been faithful to the usages and creed of the Roman Church.

Founding of Russian Church. The Russian Church was founded in 1582-1589, when a patriarchate of Moscow was instituted, and its independence was completed by the permanent holy synod.

Church Constitution. While the higher clergy consists of patriarchs, archbishops and bishops, the recognized temporal head of the Greek Church was the czar of Russia, prior to the revolution of 1917 which dethroned him. The patriarch of Moscow succeeded him. The seven rites of the Roman Church are admitted, namely, Baptism by triple immersion, Confirmation, the Eucharist, Penance, Extreme Unction, Holy Orders and Matrimony, but these vary largely in their observance. The Cross is the only graven image permitted, but the veneration of pictures is allowed. Celibacy is obligatory for bishops, but priests and deacons may marry once only. Singing is allowed only by male voices in church services, and the ceremonial is exceedingly formal. The total membership of the Greek Church is about 119,300,000. See RELIGION, subhead *Religions of the World.* A.E.R.

GREEK FIRE, a chemical compound which, when touched by water, would burst into flames almost impossible to extinguish, was employed by the Byzantine Greeks of the Middle Ages to set fire to enemy fleets and to repel the besiegers of Constantinople. It was forced through tubes in a stream of living fire, thrown from ladles or poured from caldrons. Its composition was a secret, and modern chemists can only surmise what substances formed it. One theory is that quicklime was added to some of the incendiary compounds of which the principal ingredients had been known before the Christian Era. Sulphur, pitch, charcoal, naphtha or petroleum, tallow, rosin and turpentine were among the materials of the earlier mixtures, generally known as *wildfire* and erroneously called Greek fire by the Crusaders, though lacking the qualities of the dreaded Byzantine flame. Saltpeter was added to wildfire, and, perhaps to Greek fire, in the thirteenth century, so that they differed only slightly from gunpowder, then unknown.

Liquid Fire, a German device in the War of the Nations, resembling Greek fire mainly in its effects, is described in its proper place in these volumes.

GREEK LANGUAGE, a branch of the Indo-European family of languages, akin to Sanskrit and Latin and to the languages of the Teutonic races. In its classic form it is considered to have been the most beautiful and perfect language ever spoken, not only by reason of its musical character, but because the large number of word forms made possible a precision in expression not to be had in any less inflected speech. For instance, in the classic Greek a fully conjugated verb possessed 507 different forms.

Ancient Greek. The geography of Greece influenced not only the history of the country,

but its language as well. The mountains which cut off one little group or region from another were barriers to the growth of a common language, and thus a number of dialects were in use in Greece before the dawn of the historic period. These seem never to have been so distinct, however, that inhabitants of one region could not understand those of another. The dialects of historic times are usually grouped under three main divisions—Doric, Aeolic and Ionic, this latter including Attic. The two former were more harsh and uncultivated than the Ionic, which with the Attic was the chief literary language. The poems of Homer are the oldest writings in the Ionic dialect, but Homer's language was never a vernacular—the speech of one locality; it was always a purely literary language. Later, the greatest of Greek writers, Aeschylus, Sophocles, Euripides, Xenophon, Plato, used the Attic dialect, and this has been adopted by scholars as the standard of the ancient and classic Greek.

Still later there arose a slightly modified Attic, known as the "common dialect," which the conquest of Alexander the Great made widely prevalent. Plutarch and Lucian used this form, and the New Testament was written in it.

All the alphabets of modern Europe may be traced back to the Greek alphabet (see ALPHABET), which was in its turn derived from the Phoenician. Just when it was introduced is not known, but there are inscriptions which date from the seventh century B. C. There were changes and developments in the alphabet after its adoption, but as finally worked out it consisted of twenty-four letters. Most of the consonants were pronounced much like their English equivalents, but the vowel sounds more closely resembled the German. Greek had also the so-called "rough breathing" and "smooth breathing" marks, and three accents. These did not, like an English accent mark, indicate stress, but voice pitch. Originally, Greek writing, like the Phoenician, was from right to left, later the direction alternated, "as an ox plows," but from 500 B. C. a uniform direction from left to right was followed.

Modern Greek. The modern period of the Greek language is generally considered to have begun about A. D. 800. Considering the fact that the changes which differentiate modern Greek from the old "common dialect" have been over a thousand years in the making, they are not extreme. They do affect the language in almost every department, however—in pronunciation, in inflection and in vocabulary. Just how great the differences in pronunciation are it is impossible to determine, for scholars are by no means agreed as to the exact pronunciation of classical Greek; but it is certain that six vowels and diphthongs which anciently stood for different sounds are now pronounced alike. As to syntax, the change has been from the old, fully-inflected, or *synthetic,* character to the *analytic;* that is, many old inflections have been lost, and their places taken by auxiliary words. The change in vocabulary has consisted largely in the additions of words from other languages; but since modern Greece became again an independent nation its writers have united in an effort to banish these borrowed words and to return in other ways to the usages of classic Greek. Incredible as it may seem, an educated Greek of the time of Pericles (which see), if he could return to earth, could read without great difficulty a Greek book published in the twentieth century.

As a Study in Schools. Greek, even more than Latin, has lost much of its popularity as a study in schools of every grade. About 1550 no less famous a person than Rabelais wrote to a friend that Greek was "that without which it is a disgrace for a man to style himself scholar." Much of the preëminence then granted to Greek still remains in European universities; there the highest honors are usually reserved for students of Greek and Latin. In the United States it was equally true for many years that no man could be considered well educated unless he could read and write Greek fluently. With the development of American colleges and the broadening of their curriculums, and especially since the introduction of the elective system, Greek has lost its position as a necessary part of education. Greek is still studied in colleges and even in high schools and preparatory schools, but the number of students is falling off rapidly. Most colleges no longer require Greek either for admission or for graduation, although some colleges award special degrees, such as Bachelor of Letters or Bachelor of Philosophy, to students who have offered no Greek. In preparation for the ministry, Greek is still regarded as a requisite, but in nearly all other professions it has become of secondary importance.

The study of Greek is usually begun in the high schools with elementary work in grammar and composition, followed by Xenophon's *Anabasis* and Homer's *Iliad.* The college

courses usually begin with such works as *The Apology* of Plato, the orations of Lysias and the poems of Pindar and other lyricists, and continue with the works of Euripides, Aeschylus, Sophocles, Herodotus, Aristophanes, Thucydides and Aristotle.

Words Derived from the Greek. Modern English, as well as French, Spanish and other languages, contains many words of Greek origin. It is true that most of the Greek words in English are less frequently used than the Anglo-Saxon or even the Latin words. But in the arts and sciences the technical words are nearly all Greek or Latin, the Latin words, in turn, being frequently derived from the more ancient Greek. Such words as *homiletics, amphibian, ambrosia, amaranth* and *grammar* are all Greek in origin. W.L.W.

GREEK LITERATURE. Though written in what is known as a "dead language," because in its old form it is spoken by no nation in the present age, the literature of ancient Greece is alive as truly as are the writings of to-day, and it is far more influential than most of them. In every country and every age writers have found in it inspiration and guidance, and in certain departments its productions have never been surpassed. Though less stress is laid on the teaching of Greek literature in schools and colleges now than a generation or two ago, some knowledge of its great masterpieces is necessary to a liberal education, and the person who cannot understand an allusion to the *Iliad* or the *Odyssey* is likely to find himself seriously handicapped in reading many modern works. In such a brief treatment as this must be, it is more satisfactory to divide Greek literature into its various branches than to attempt chronological grouping.

Poetry. Almost every variety of poetry the Greeks developed to a high point of excellence. Sappho, Anacreon and Pindar wrote lyrics, exquisitely rhythmic poems which were supposed to be sung or chanted to the music of the lyre; and some of their forms and meters modern poets have found well worth imitating. Didactic poetry began with Hesiod, and has seldom if ever risen above his level—for this is not one of the highest types of verse. The great glory of Greece, however, was in its epics and dramas. It is really difficult to imagine what subsequent literature would have been had there been no *Iliad*. Vergil's *Aeneid*, Dante's *Inferno*, Milton's *Paradise Lost* and Longfellow's *Evangeline*, to mention merely the most outstanding examples, are inestimably indebted to it, as are countless shorter poems. If it had called into being but one poem, Keats' *On First Looking into Chapman's Homer*, with its haunting description of the men who—

> Look'd at each other with a wild surmise,
> Silent upon a peak in Darien,

English literature would owe it a very real debt.

In the field of drama, both comedy and tragedy were brought to perfection (see DRAMA). Aristophanes was a master of humor and satire, while Aeschylus, Sophocles and Euripides produced tragedies which, in beauty, strength and passion, still rank among the greatest in the world. Even in translation these masterpieces have a depth and dignity possessed by few more modern works.

Prose. To many a modern reader the word *prose* suggests, first of all, fiction. Of this form of literature the Greeks knew nothing, or next to nothing. Their myths were tales full of interest and charm, as many modern children can testify, and they had an occasional legend which they delighted in working up, but of stories in the sense in which they are known to-day there were none. But other forms of prose reached a high level. To Herodotus, the "Father of History," and to Thucydides and Xenophon modern historians have looked, not only for much of their ancient material, but for inspiration and for suggestions as to manner. Plato and Aristotle produced philosophic writings which were the world's textbooks for centuries, and no modern philosopher is unaffected by them; while Greek orators, notably Demosthenes, left practically nothing for later orators to achieve.

Later, when Alexandria in Egypt became the center of Greek culture, prose and poetry of many forms were produced, but much of it was of a quality inferior to that of the earlier periods. The great Alexandrian Library (see ALEXANDRIA) was a spur to writers, and history, scientific treatises, epics, lyrics and philosophic works were poured forth. Euclid, Archimedes, Josephus, Plutarch and Ptolemy flourished in this period, but of most of these it may be said that it is the content rather than the form of their writings which makes them valuable, and that in a measure shuts them out of the province of fine literature.

In these volumes there are articles on all the Greek writers named above, and a comprehensive view of Greek literature may be gained by reading them in connection with this article. Consult Wright's *A Short History of Greek Literature;* Carpenter's *Long Ago in Greece.*

GREE'LEY, Colo., the county seat of Weld County, located in one of the most fertile irrigated farming sections in the state, fifty-two miles north by east of Denver, and fifty-three miles south of Cheyenne. It is on the Cache La Poudre, South Platte and Thompson rivers, and on the Union Pacific, the Colorado & Southern and the Denver, Laramie & Northwestern railroads. The area of the city is nearly four square miles. The population, which in 1910 was 8,179, in 1916 was 11,420, by Federal estimate.

Greeley is situated on the great plains at the base of the Rocky Mountains, which are about forty miles distant. Melting snows of the mountains, retained in great reservoirs, furnish water for extensive irrigating projects in this section. The land is well suited to the raising of sugar beets, potatoes, peas, onions and cabbages. One of the largest sugar-beet factories in the state is located here, and this and two others in the same county produce an annual output valued at $5,000,000. Flour mills, elevators and vegetable-canning factories are other important enterprises. Sugar beets and field peas are also grown for feed for cattle and sheep, which are raised in considerable numbers. Near the city there are rich coal fields.

Greeley is the location of a state normal school. Among the more prominent buildings are a Federal building, erected at a cost of $150,000, a county courthouse costing $400,000, a Y. M. C. A. building, a library and three hospitals. Island Grove is a municipal grove of forty acres. Estes National Park, a favorite tourists' resort, is about fifty-five miles west.

Greeley was founded in 1870 by a colony from New England and New York under the direction of Nathan Cook Meeker, agricultural editor of the New York *Tribune,* and the town was named in honor of Horace Greeley, founder of that paper. The organization of colonists, then called the Union Colony of Colorado, still survives and holds reversionary rights in all places where intoxicating liquors are handled. Greeley was chartered as a town in 1871 and as a city in 1886. J.F.MC C.

GREELEY, Horace (1811-1872), America's most famous journalist, the founder and first editor of the New York *Tribune,* and the most influential of that famous group of American editors who represented the "old school" of journalism. His position as a molder of public opinion, especially during the last two decades before the War of Secession, is fittingly summarized in Whittier's characterization of him—"our later Franklin." Horace Greeley was born in Amherst, N. H., on February 3, 1811. He was reared in poverty, and received only a common school education. When a lad of fifteen be became an apprentice in a newspaper office at East Poultney, Vt., learning there his first lessons in the profession that was destined to bring him into national prominence.

HORACE GREELEY
Probably the greatest editor America has produced.

In 1831 Greeley appeared in New York City, with ten dollars in his pocket and a bundle of clothes swung over his shoulder. After supporting himself for two years by doing job work in various printing offices, he founded, with two friends, the *Morning Post,* the first two-cent daily ever published. It was a financial failure, running only three weeks after January 1, 1833. In March, 1834, its successor, *The New Yorker* appeared; this was a weekly literary newspaper that enjoyed wide popularity during its seven years of existence.

In 1840 Greeley began the publication of *The Log Cabin,* a weekly campaign paper that gave brilliant support to the candidacy of William Henry Harrison, the Whig nominee for the Presidency. The following year this paper was merged with *The New Yorker* into the *Weekly Tribune,* a periodical which had readers throughout the northern half of the Union from Maine to Oregon, and which wielded an influence unheard of up to that time. Through its columns Greeley urged the people to oppose the extension of slavery, and because people believed in him he became a mighty force in strengthening the anti-slavery sentiment throughout the North. In April, 1841, he issued the first copies of the *Daily Tribune,* which is still published in New York City. In this paper he vigorously preached the doctrines of the protective tariff and anti-liquor legislation.

Greeley's commanding position in journalism made him a prominent figure in national politics; he was one of the founders of the Republican party and a delegate to its first national convention, where he used his influence to secure the nomination of Lincoln. While he

was a loyal supporter of the President during the war, he was willing to end the struggle by compromise, and in 1864 went to Canada to confer with several Confederate agents on the subject of peace, but the effort was fruitless. When the war was over he urged the granting of a universal pardon to those who had taken part in it, and was one of the signers of the bail bond of Jefferson Davis (which see).

Greeley's interest in politics continued until his death. He was a severe critic of President Grant's administration, and in 1872 was nominated by the Liberal Republicans (see POLITICAL PARTIES IN THE UNITED STATES) for the Presidency. The Democratic party, which adopted the platform of the Liberal Republicans, made him their candidate as well, but in the election Grant won a decisive victory. Worn out by the excitement and suspense of a strenuous campaign and crushed by the death of his wife, Greeley became seriously ill soon after the election, and died on November 29, 1872. Thousands viewed his body, which lay in state in the City Hall in New York, and his funeral was attended by men of national eminence, including the President and Vice-President of the United States. He had many enemies, but no one could fail to honor him for his upright life, his justice and his moral integrity.

Greeley was well known as a lecturer and writer, and he traveled widely in Europe and in America. His publications include *Hints Toward Reforms, Glances at Europe, Overland Journey to San Francisco, The American Conflict* and *Recollections of a Busy Life.*

Consult James Parton's *Life of Horace Greeley.*

GREELY, ADOLPHUS WASHINGTON (1844-), an American soldier and scientist, whose chief claim to fame lies in his valiant service in Arctic exploration. He was born at Newburyport, Mass., and served as a Union volunteer during the War of Secession. At the close of the war he was appointed a lieutenant in the regular army and was attached to the signal service. In 1881 he commanded the expedition sent out by the United States government to establish observation stations towards the North Pole, and made many valuable scientific observations and discoveries. A detachment of his expedition reached a higher latitude than had been before attained, thus winning from England an honor held for three centuries. The non-arrival of the promised relief ships compelled Greely to move southward in 1883, and after losing eighteen of his twenty-five men he was rescued at Cape Sabine by a party under Captain Winfield Schley, afterwards prominent in the Battle of Santiago, in the Spanish-American War.

Greely was appointed chief signal officer of the army by President Grover Cleveland in 1887, and was head of the Weather Bureau from that year until it passed under the control of the Department of Agriculture. During the Spanish-American War he was in charge of cable censorship. In 1906, with the rank of major-general, he was in command at San Francisco after the fire, and in 1907 he quelled without bloodshed a Ute Indian disturbance in Wyoming. In 1908 he reached the age limit for active service and was retired. He became a member of the International Colonial Institute, and on seven occasions represented his country abroad, the last time as military ambassador at the coronation of George V. His publications include *Three Years of Arctic Service, Handbook of Polar Discoveries* and *American Weather.* See POLAR EXPLORATIONS.

GREEN, one of the colors of the solar spectrum, appearing between blue and yellow. Green is one of the most common colors in nature; the grass and nearly all foliage is green. We speak of "green sea water," and in the mineral kingdom we find green in malachite and in the emerald. Many tropical birds have beautiful green plumage and the wings of some species of South American butterflies are gaudy with hues of this same color. Green is the national color of Ireland, and in the past Lincoln green was worn as a mark of distinction by the Scotch highlanders. Green is worn on Saint Patrick's Day, March 17. It is the sacred color of the Mohammedans, who carry the green flag, and the background of whose prayer rugs is always green, let the design worked into the fabric be what it may. Traditionally green is the color of repentance.

Green pigment can be made by mixing blue and yellow pigments, but most of the green paints and dyes, such as Paris green, emerald green and imperial green, are made by boiling copper acetate in a solution of a compound of arsenic and oxygen. Such paints and dyes are deadly poisons, and they should be handled with care and always be kept out of the reach of children. Most of the green dyes formerly made from vegetable compounds are now derived from coal tar. The numerous tints and hues are formed by mixing the pigments in varying proportions. Most green pigments

fade quickly when exposed to the sun. See colored chart, in article COLOR.

Because green is the color of growing and immature plants, the term is occasionally applied to persons. When so used *green* means lacking in knowledge and experience. The city boy says the country boy is *green* because he does not know city ways, but when the city boy visits his country cousin he is just as *green* on the farm as the cousin is on the streets of a great city.

GREEN, ANNA KATHARINE. See ROHLFS, ANNA KATHARINE GREEN.

GREEN, HETTY HOWLAND ROBINSON (1835-1916), an American financier, at the time of her death the richest woman in America. She was born at New Bedford, Mass., and was educated at Mrs. Lowell's School in Boston. In 1865 her father died, leaving her a large fortune, and two years later she married Edward H. Green of New York, who died in 1902. Though accounted to be the world's greatest woman financier, her manner of living was simple in the extreme. There was scarcely a colossal corporation or business enterprise of great importance anywhere in the world in her day in which she did not have an interest, and her real estate holdings in Chicago, New York and other cities were enormous. Her business, as well as her property, always remained under her personal management.

Edward H. Green, born in 1868, only son of Hetty Green, has achieved success in railroad enterprises in the Southwest, particularly in Texas.

GREEN, JOHN RICHARD (1837-1883), an English historian, was born at Oxford and graduated from Magdalen College, in that city, in 1859. His first important historical work, *A Short History of the English People,* while not absolutely authentic in detail, presents a vivid panorama of the past, and is the basis of his enduring fame. Its publication met with immediate success, and it was later expanded into his great *History of the English People.* His second book, *The Making of England,* was a more scholarly but less popular piece of work. This was followed by *Stray Studies in England and Italy,* a collection of essays. His *Conquest of England* was published by his widow after his death.

GREEN'AWAY, KATE (1846-1901), an English illustrator of books for children, famous the world over and appreciated by young and old, for the quaint charm, simplicity and delicate humor of her sketches. Her subjects are mainly flowers and landscape. She also wrote verses to accompany her drawings. Among her most successful works are *Under the Window, A Painting Book of Kate Greenaway, Mother Goose, Language of Flowers* and *Kate Greenaways' Almanacs.* John Ruskin and leading art critics everywhere have praised highly the works of this lover of children.

GREENBACK PARTY. As a result of an excessive issue of greenbacks by the Government of the United States during the War of Secession and in the years immediately following, money was "cheap" (see MONEY), and prices were correspondingly high. Agricultural products and manufactured articles sold for more than for years previously, and it was urged that this was due to the plentiful supply of greenbacks; the opinion was doubtless strengthened by the fact that payment was nearly always made in that form of money. A close money market resulted from the panic of 1873, and the advocates of "cheap money" believed that a new issue of greenbacks would restore prosperity, especially to the farmers. Money which could be issued in unlimited quantities and which could be used in payment of all debts seemed a cure for every financial evil.

A national political organization was formed by those favoring unlimited use of this paper currency, and naturally it was called the Greenback party. The Greenbackers' platform demanded the withdrawal of all bank currency from circulation, that henceforth no currency should be circulated except government paper (greenbacks) "based on the faith and resources of the nation" (which meant fiat money), and that gold and silver should be used in payment of interest and principal on government bonds only where it was promised. The party held a national convention in 1876 and placed a Presidential candidate, Peter Cooper, in the field; it polled nearly 82,000 votes, but secured no Electoral votes. In 1880 alliance was made with the Greenback-Labor party. See FIAT MONEY; POLITICAL PARTIES IN THE UNITED STATES.

GREEN'BACKS, the paper money of the United States government, not including the gold and silver certificates, known as *treasury notes.* Greenbacks, so called because of their color, were first issued in 1862 to finance war operations. Until 1879 they were merely promises of the United States to pay, and were unsecured by metal money; at one time, when confidence in the government was slight, they

were worth only thirty-five cents for each dollar. Since then their issue has been fixed at $346,681,016, the amount in circulation at the time, and they are redeemable in gold. See SPECIE PAYMENT, RESUMPTION OF; MONEY.

GREEN BAY, WIS., the oldest city in the state and the county seat of Brown County. It is situated at the southern extremity of Green Bay, an arm of Lake Michigan, at the point where it receives the waters of the Fox River. Milwaukee is 113 miles south, and Chicago is eighty-five miles farther south. Transportation facilities are offered by the Chicago & North Western; Chicago, Milwaukee & Saint Paul, Green Bay & Western, and Kewaunee, Green Bay & Western railways; there is steamer connection with other ports on the Great Lakes during the summer season. An electric line extends through Fox River Valley to Fond du Lac, sixty-five miles southwest. The population increased from 25,236 in 1910 to 29,353 in 1916, by Federal estimate.

Green Bay is located in a popular summer resort region, the small lakes and rivers of the district providing picturesque scenery and fine boating, fishing and bathing facilities. The residence district of the city is made beautiful by wide streets with double rows of trees on either side. Six bridges span the river. Of the city's eight parks, Union Park is the largest; it contains Tank Cottage, the oldest house in the city, built in 1789. Bay View Beach, the "Coney Island" of the city, is seven miles north, and offer the amusements of an ideal beach resort. The Oneida Indian Reservation is west of the city.

Buildings and Institutions. Besides a county courthouse and city hall, the city has a $180,000 Federal building, the $150,000 Minahan Building, a fine school building and a number of handsome churches. Saint Mary's hospital, the Wisconsin Deaconess hospital, Brown County insane asylum, the county poorhouse and the Good Shepherd Home are institutions worthy of note. Besides its public and parochial schools it has Saint Joseph's Academy for girls. The Kellogg Library, containing 30,000 volumes, is the joint gift of Rufus B. Kellogg and Andrew Carnegie.

Through its harbor, which receives the largest vessels on the Great Lakes, and its exceptional railway transportation facilities, Green Bay has become one of the great distributing centers of the state. The leading export through the harbor is grain, and the largest single import is coal; there is an extensive trade in fish, and that in lumber is important. There are about forty wholesale and jobbing houses, and they do a large business in agricultural and dairy products. There are also paper mills and sawmills, canneries, breweries and manufactories of crockery, hardware and machinery. Over 2,000 people are employed in the large machine and repair shops of the railroads serving the city. Green Bay was incorporated as a borough in 1838 and as a city in 1854. In 1895 the town of Fort Howard was annexed, and in 1916 the commission form of government was adopted. H.A.

GREEN BRI'ER, the name applied to a number of plants of the genus smilax, of the lily family. The name especially relates to a greenish, prickly, climbing shrub, with thick leaves and small clusters of flowers, found in the United States and Canada. See SMILAX.

GREENE, NATHANAEL (1742-1786), a general of the Revolutionary War, known as "the man who saved the South," was born at Patowomut, R. I. During his early boyhood days he lived the quiet life of the Friends, as his father was a prominent Quaker. When the Revolutionary War clouds gathered he turned his attention to colonial defense. A slight limp in his walk was first thought to unfit him for hard service, but he rose quickly from the ranks of the "Kentish Guards" and was chosen brigadier-general. When news of the Bunker Hill battle reached Rhode Island his regiment marched to Boston, and when Washington reached Cambridge he was sent to welcome the new commander-in-chief. Washington discovered that he was a valuable officer and made him a major-general.

NATHANAEL GREENE

After the British were defeated in New York and New Jersey in 1776 and 1777, they turned their attention to the South and captured Savannah. Greene succeeded General Gates in 1780 in command of the army of the South, which had been so often defeated that it was known as "only the shadow of an army," but Greene's judgment, patience, kindness and

energy counted in this crisis. Daniel Morgan, the sharpshooter, and "Light-horse Harry" Lee were sent to his aid, and at Cowpens he defeated the British general, Tarleton, in January, 1781. One after another the British forts were captured in South Carolina. This great soldier, who had endured so many hardships in war, was counted, next to Washington, the greatest general of the Revolution.

GREENFIELD, Mass., the county seat of Franklin County, and a summer resort in the hill country of the northwestern part of the state. It is situated on the north bank of the Deerfield River, two miles above its junction with the Connecticut River, and is twenty miles south of the Vermont state line and fifty-six miles by rail west of Fitchburg. It is served by two branches of the Boston & Maine Railroad and by the Connecticut Valley electric interurban line. The population, which in 1910 was 10,427, was reported by the state census of 1915 as 12,618.

Greenfield, which includes an extensive park system, covers an area of twenty square miles. It takes its name from the beautiful green fields of its own meadow lands. Along the rivers and in the hills are a number of points of scenic interest. Many motor parties coming by way of the "Mohawk Trail" visit Greenfield during the summer. Two of the largest hotels sometimes accommodate many thousand guests each in one season.

A Federal building, erected in 1916 at a cost of $100,000, a public library, two hospitals, hotels, and banks are among the prominent buildings. There are manufactories of taps and dies, fuel stokers, cutlery, paper boxes, bricks, cement building blocks, agricultural implements and children's carriages. Settled in 1682, Greenfield was a part of Deerfield until the year 1753. G.H.K.

GREENHOUSE, a house of glass on a framework of wood, or iron and wood, used for the protection or growth of delicate plants, and of plants grown out of season. Such a building must have plenty of light, and is almost invariably glass-covered. When the heat is not sufficient for the tender plants, artificial heat is supplied. Small structures are heated with stoves, but the largest have coils of pipes carrying steam or hot water. Sometimes a series of greenhouses clustered together and heated from a central plant may cover several acres of ground.

A greenhouse used for the display of flowers, rather than their growth, is known as a *conservatory* (which see). Other places called greenhouses are *orchard houses, warm houses, bark stove houses, graperies,* etc., and those two commercially important houses, *forcing houses* and *hothouses.* In them are brought to life and bearing many out-of-season luxuries—vegetables, fruits and flowers, which bring the growers and dealers unusually high prices.

GREEN'LAND, an island lying almost entirely within the Arctic Circle, to the northeast of the mainland of North America. Next to Australia it is the largest island in the world. It is separated from the American continent by Davis Strait, Baffin Bay and Smith Sound. More than 1,400 miles long and 690 miles wide, it covers an area of 826,000 square miles, twelve times greater than the six New England states and as large as British Columbia, Alberta and Saskatchewan combined. All of Germany, France, Italy and Spain combined lack over 100,000 square miles of being as large. Yet Greenland is in most respects worthless for the purposes and necessities of man.

It is a Danish colony, and there are a few Danish settlements on the west and southeastern coasts. The interior forms a plateau with an average height of 4,500 feet, surrounded by rocky coasts rising several hundreds of feet direct from the ocean. Here and there are mountains over 10,000 feet high. Many deep fiords and bays indent the coast, which resembles that of the west of Norway. Ice covers more than three-fourths of the surface, and in some parts it is 2,000 feet thick. There are thousands of glaciers, some of them the largest in the world. The island is of volcanic formation, consisting of a mass of Archaean and igneous rocks similar to those found in Spitzbergen and part of Western Europe. At some far distant date Europe, Spitzbergen and Greenland were all connected by land which sank into the sea (see Geology).

LOCATION MAP

Climate. During the long summer day of eighteen to twenty-two hours the soil in some parts of the island, especially near the coast, produces luxuriant vegetation and flowers. The

greater part of the surface, where free from ice, is covered with moss and lichens, and here and there alder, juniper and other berries are found. The average temperature in the south of the island during summer is 48° F. In no part does the temperature rise above the freezing point, 32° F., for more than 140 days in the year, while in the north the cold is intense all the year round. The climate is very uncertain and liable to swift changes from bright sunshine to dense fogs or snowstorms.

Resources. Agriculture is impossible, but in a few favored spots a little gardening is done. The principal occupations are fishing and hunting. Cryolite, used in making aluminum, is mined and exported in quantities varying from 6,000 to 12,000 tons annually. The mining rights are held by an American company, under a charter from the Danish government. The whole of the commerce, except in minerals, is a monopoly granted to the Danish Greenland Company, with head offices in Copenhagen. Whale and seal oils, sealskins and eiderdown form the principal exports and constitute the chief form of local currency, all internal trade being conducted by barter. Government stores supply the needs of the natives and the few European inhabitants.

Government. About one-twentieth of the island is occupied by Danish settlements, and for purposes of administration the colony is divided into North and South Greenland. An inspector, appointed by the king of Denmark, presides over each district. The most important settlements are Sydproven, the largest in the island; Godhaven, capital of North Greenland; Godthaab, capital of South Greenland, and Upernivik, the most northerly civilized port in the world.

History. Greenland was first colonized by Norwegians about 983, when Eric the Red led a party of voyagers to the island. Later, probably in the twelfth century, Norsemen are supposed to have made their way from Greenland to the American continent. After having been a separate state for many years, it became incorporated with Norway in 1260. For a time Greenland received no attention, all connection with Europe having ceased, but in 1585 it was rediscovered by Davis. Numerous expeditions visited the island, but no attempt at colonization was made until the Danes established mission stations on the west coast in 1721. Recent discoveries and explorations in and around the island are described under the heading POLAR EXPLORATIONS. The population of Greenland was estimated at only 13,571 in 1911, and consisted chiefly of Christian Eskimos, with about 300 Europeans. For the manner of life of the natives, see ESKIMO. F.ST.A.

Consult Smith's *Eskimo Stories;* Mikkelsen's *Lost in the Arctic;* Nansen's *In Northern Mists.*

GREEN MOUNTAIN BOYS, a name assumed by a body of soldiers from Vermont during the Revolutionary War. They captured Fort Ticonderoga and Crown Point, and were responsible for the victory at the Battle of Bennington. They were organized originally by Ethan Allen to oppose the claims of New York to the territory of Vermont. The Green Mountain Boys were the first to ask that Vermont be regarded as a state. This was not granted until 1791, when it was admitted as the fourteenth state. See ALLEN, ETHAN.

GREEN MOUNTAINS, one of the oldest mountain ranges in North America. It belongs to the Appalachian system, beginning in the southern part of Connecticut and extending northward through the western part of that state and Massachusetts into Vermont and Quebec. The range is known as the Green Mountains in Vermont only; in Massachusetts and Connecticut it takes the name of the Berkshire Hills, Taconic Mountains and Hoosac Mountains. Erosion and weathering have worn down their peaks until in some places they are merely low, round hills. The highest peaks are mounts Killington, Mansfield, Camel's Hump, Lincoln and Jay; the greatest elevation is in Mansfield Peak, Vermont, 4,279 feet. The highest point crossed by a railroad is the small village of Summit in Rutland County, Vermont. Some of the best building stone in the country is found in the Green Mountains. The forests of hemlock, fir, pine, spruce and other evergreens have given the name to this range. The Green Mountains are much frequented in summer by tourists, who are attracted by the beautiful scenery and pleasant climate.

GREENOUGH, *green'o,* HORATIO (1805-1852), an American sculptor and art critic, was born at Boston, Mass. He was a Harvard graduate, and during his college days devoted himself especially to the study of anatomy. The most important works of his early career were a bust of Washington modeled from Stuart's portrait, and the design from which the Bunker Hill Monument was constructed. During the latter part of his life he had his studio in Florence, where he did his best work, includ-

ing a colossal statue of Washington, now in the Capitol at Washington. Here are also to be found his groups of *The Rescue,* which took him eight years to complete. Among the well-known Americans who sat for portraits to him are John and John Quincy Adams, Henry Clay, John Jacob Astor and John Marshall.

GREEN RIVER, an important tributary of the Ohio River, rising in Lincoln County, near the center of the state of Kentucky. It flows west and northwest until after a course of 300 miles it joins the Ohio about eight miles from Evansville. It is navigable for small vessels for about 200 miles, with the aid of locks and dams. Green River passes close to the mouth of the Mammoth Cave (which see) and receives the waters of the Echo River, which flow through an underground passage from the cave.

GREENSBORO, N. C., one of the progressive cities of the New South, situated northwest of the geographical center of the state, in Guilford County, of which it is the county seat. It is eighty-one miles northwest of Raleigh, the state capital, and on the Southern Railroad. The place was settled in 1808, was chartered in 1870 and was named in honor of General Greene, who commanded the Continental army in the Battle of Guilford Courthouse (March, 1781). Since 1911 the commission form of government has been in operation. The population has grown steadily; in 1916 it was estimated by the Census Bureau to be 19,577, an increase of 3,682 since 1910. The area of the city is four square miles.

The region in which Greensboro is located is rich in tobacco, fruit and grain, and the city has a considerable trade in these and its manufactured products, which include cotton goods, cotton-mill supplies, carpets, fertilizers, furniture, stoves, tiles and buggies. Iron, copper and gold are also found in this locality, and the city has a large blast furnace. In its territory, Greensboro is noted as an educational center, being the seat of Greensboro Female College (Methodist Episcopal South), opened in 1846, and the State Normal and Industrial College, for white students. For colored students the city has the Bennett, the Lutheran and the State Agricultural and Mechanical colleges. There are two parks, several hospitals, a public library and a Masonic Home.

GREENSBURG, PA., the county seat of Westmoreland County, situated in the southwestern section of the state, thirty-one miles southeast of Pittsburgh and on the Pennsylvania Railroad. Electric lines connect with cities south, and through Pittsburgh with cities west. The people are engaged in coal mining and in making glass, iron and brass products and steam-heating apparatus. Saint Mary's and Saint Joseph's academies, in addition to the public schools, offer educational advantages. The borough was settled in 1784, became the county seat in 1787 and was incorporated in 1799. In 1773 the first organized court of justice west of the Alleghany Mountains was held in Hanna's Town (destroyed by Indians in 1782), a few miles from the site of Greensburg. The boroughs of East Greensburg, Southeast Greensburg and Ludwick were annexed to Greensburg in 1905. In 1910 the population was 13,012; in 1916 it was 15,483, by Federal estimate. The area of the borough is nearly two square miles.

GREENVILLE, MISS., the county seat of Washington County, situated on the northwestern border of the state and on the Mississippi River. Jackson, the state capital, is 100 miles southeast, and Memphis is 139 miles north. Railway transportation is provided by the Southern and the Yazoo & Mississippi Valley railways, and there is steamer connection with the various river ports. This section of the country has a remarkable growth of cotton, and large quantities of it are shipped from Greenville. Aside from the kindred cotton establishments, cottonseed oil factories, gins, compresses, etc., saw and planing mills are the only important industrial plants in the city. Greenville was incorporated in 1870 and was chartered in 1886. In 1910 the population was 9,610; in 1916 it was 10,846, by Federal estimate.

GREENVILLE, S. C., the county seat of Greenville County, is an important cotton-textile-manufacturing city in the northwestern part of the state. It is 111 miles northwest of Columbia, the state capital, thirty-two miles west by south of Spartanburg and 160 miles northeast of Atlanta, and is on the Reedy River, near rapids which furnish power for several large mills. Transportation facilities are provided by the Southern, the Charleston & Western Carolina, the Atlantic Coast Line and the Greenville & Western railroads, and by the Piedmont & Northern interurban electric line. The population of the city in 1910 was 15,741, and in 1916 it was 18,181, by Federal estimate. It lies near many smaller towns, and covers an area of nearly five square miles.

Greenville is pleasantly located at an altitude of 1,000 feet among low, outlying hills of the Blue Ridge Mountains. It contains the Furman University (Baptist); Greenville Woman's College (Baptist); Chicora College (Presbyterian); Sacred Heart Academy (Roman Catholic), and two business colleges. The city has a Federal building, and a Carnegie Library, constructed in 1916.

Greenville is one of the largest textile-manufacturing cities of the South. Its mills operate nearly 600,000 spindles, and in them and allied industrial plants are about 7,000 employees. This city is an important cotton market for Southern mills, and contains large engineering offices which design and supervise much of the mill construction of the South. Cotton mills, bleaching mills, hardwood manufacturing plants, foundries, flour and grain mills, cigar factories, granite works and carriage and wagon works are the important industrial establishments.

Greenville was settled in 1776 and incorporated in 1831. It was first chartered as a city in 1868; the government is now administered under a charter granted in 1902. W.F.R.

GREENVILLE, TEX., the county seat of Hunt County, situated in the northeastern section of the state and on the headstream of the Sabine River, fifty-one miles northeast of Dallas. It is the junction of the Missouri, Kansas & Texas, the Texas Midland and the Saint Louis Southwestern railways, and these shipping facilities make it the trade center for a rich agricultural and stock-raising district. It is also an important cotton market in the state, and has cotton gins, cotton compresses and a cottonseed oil refinery. For higher education the city has Burleson College (Baptist) and Wesley College; one mile distant, in a community known as "Holiness people," is Holiness University, founded in 1898. Greenville was settled in 1844, was chartered as a city in 1875 and adopted the commission form of government in 1907. In 1910 the population was 8,850; in 1916 it had increased to 10,099, by Federal estimate. The area of the city is nearly five square miles.

GREEN VITRIOL, *vit'ri ul,* another name for copperas (which see).

GREENWAY, THOMAS (1838-1909), a Canadian statesman, premier of Manitoba from 1888 to 1900. He was born in England, but emigrated to Canada at an early age, and became a merchant in Ontario. From 1875 to 1878 he sat in the Dominion House of Commons, and in 1879, having in the meanwhile removed to Manitoba, he was elected a Liberal member of the Manitoba legislature. In 1887 he became leader of the Liberal opposition, and in the following year became premier. The chief events of his administration concerned the parochial or separate schools, which he succeeded in abolishing in 1890. He also secured the passage of a law abolishing French as an official language for the province. These measures excited bitter opposition throughout the Dominion, and became a national political issue (see MANITOBA, subhead *History*). Greenway was succeeded as premier by Hugh J. Macdonald (now Sir Hugh). G.H.J.

GREENWICH, *grin'itch,* the English town from the meridian of which geographers of the world reckon longitude. It is situated on the right bank of the Thames, six miles southeast of London Bridge, in the County of Kent.

GREENWICH OBSERVATORY

The famous Royal Observatory, founded by Charles II in 1675, stands upon a hill in Greenwich Park. The fact that England largely influenced the scientific world at the time, and that the Greenwich Observatory then excelled all others, made it the natural choice as the center for the world's astronomical observations. Therefore the longitude of Greenwich was placed at 0°. From the clock in the observatory the time is daily flashed by electricity throughout the United Kingdom at exactly noon.

The hospital established by Queen Mary in 1705 as a home for disabled seamen, with accommodations for over 3,000, was, in 1873, turned into the Royal Naval College for the education of naval officers. The hospital was formerly a royal palace, and was the birthplace of Henry VIII, Mary and Elizabeth. Greenwich now has extensive iron foundries, engineering works, docks and shipbuilding yards. Until 1894 it was customary for the British

Cabinet to hold an annual banquet at an old-fashioned hostelry at Greenwich; this was always referred to as a "whitebait dinner," Greenwich being noted for whitebait caught in the Thames. Population in 1911, 96,000. See LONGITUDE; LONGITUDE AND TIME.

GREGO'RIAN CALENDAR. See CALENDAR.

GREGORY, *greg'o ri,* the name of sixteen Popes, at least two of whom were among the most important occupants of the Papal chair. The name has also been borne by two antipopes (see ANTIPOPE).

Gregory I, called THE GREAT (about 540-604), was of noble family and was educated not for the Church but for the law. However, he was vitally interested in religious matters, and when he came into possession of the family fortune he devoted it to the founding of monasteries. To one of these, in his native city of Rome, he retired, and there took the vows of a monk. One day while walking in the market place he saw several Anglo-Saxon youths being sold as slaves, and inquired of what nationality they were. "Angles," was the reply. "Not Angles, but angels," exclaimed Gregory, referring to their fair skin and light hair, and from that moment vowed that he would go as a missionary to Britain, the home of these beautiful youths. So highly was he esteemed in Rome, however, that Pope Benedict I would not allow him to go, and under Benedict's successor, Pelagius II, he was sent on important service to Constantinople.

When Pelagius died in 590, Gregory was chosen Pope despite his protests, and his wise, zealous administration of his office fully justified the choice. He organized the ritual and the services of the Church, and was especially active in missionary enterprise. Augustine (which see) was sent to England on the mission which Gregory himself had so desired to undertake, and missions were also established in Sicily, in Sardinia and in Lombardy. Indeed, it is difficult to overestimate the value of Gregory's services in establishing the Church on a firm basis and in forwarding reforms among the clergy. His writings include an important *Exposition of Job* and *The Book of Pastoral Rule.*

Gregory VII, Pope from 1073 to 1085, was actuated in almost every move of his most important reign by the conviction that the Pope was the sovereign ruler in matters political as well as religious, when rulers interfered in things that were purely spiritual or ruled their governments to the detriment of their subjects. The controversy between him and the emperor on this subject made much of the history of the time. Hildebrand, as he was called before his election to the Papacy, was born in Tuscany about 1020, of a humble family, and was educated for the Church. His rise in churchly rank was steady, and his election in 1073 to the Papal chair was unanimous. One of his first acts was the prohibition of clerical marriage, and in this he met with great opposition. Not daunted, he turned his attention against the abuse of lay investiture, as it was called. That is, he forbade the people to recognize the authority of any priest or Church official who had received his office from a secular ruler. As this right of investiture had been the only hold the Emperor Henry IV had had on the clergy of his dominions, the emperor refused to abide by the Papal decrees and continued to recognize the bishops whom he himself had created. Gregory summoned him to appear in Rome, but Henry assumed a defiant attitude and declared Gregory deposed.

But the Pope had stronger weapons in his hands. He not only excommunicated Henry, but released all Henry's subjects from their allegiance to him, and the emperor realized the uselessness of resistance. To Canossa, where the Pope was staying, he went to make his submission, and in the words of Gregory himself, "having laid aside all belongings of royalty, wretchedly, with bare feet and clad in wool, he continued for three days to stand before the gates of the castle." Add to this that it was severe winter weather, and that he had to stand in the snow, and the depths of Henry's humiliation may be seen. Finally the Pope relented and absolved him, but Henry had submitted only to gain his point, and in 1080 again rebelled against the Pope and declared him deposed. While Henry was besieging Rome, Gregory shut himself up in the castle of Sant' Angelo, and though he was liberated in 1084 he was obliged to withdraw to Salerno. There, in retirement, he died, exclaiming almost with his last breath, "I have loved justice and hated iniquity; therefore I die in exile." See HENRY IV.

Gregory XIII (1502-1585) was made Pope in 1572, after he had served as theologian at the Council of Trent, as legate to Spain and as cardinal. He was especially interested in education, believing that only through its aid could the growing heresies of Protestantism be combated, and he did much to aid the Jesuits.

But his reign is of general interest chiefly because of his reform of the calendar, the Reformed or Gregorian calendar in use to-day dating from his time. See CALENDAR. G.W.M.

GRENADE, *gren ayd',* a small explosive bomb, formerly used in war by specially trained men called grenadiers. It usually consisted of a hollow ball of metal filled with gunpowder and exploded by a fuse or percussion cap. Grenades were extensively used in the seventeenth and eighteenth centuries, but during the nineteenth century were regarded as useless and obsolete. The war between Japan and Russia in 1904 saw a revival of these weapons, which were used with deadly effect during the siege of Port Arthur. In the War of the Nations, which began in 1914, grenades were important weapons in trench warfare and were used by all the armies engaged. When filled with modern explosives they are found to be very effective. To-day grenades are made of steel tubes filled with guncotton, nitroglycerine, picric acid or other explosives, and are thrown by hand or discharged by catapults into the trenches or into the ranks of opposing forces.

GRENADIER, *gren a deer',* originally one of a body of soldiers specially trained in the use of grenades, or bombs. Such weapons had been in use long before it was found necessary to organize special companies of grenade throwers, and a few years later full companies in each company of the King's Regiment of the army of France were trained as grenade throwers, and a few years later full companies of grenadiers were formed. England quickly followed the example set by France, and it gradually spread to all European armies. The grenadiers were picked men, usually the tallest in the regiment, and they wore a distinctive headdress consisting of a loose fur cap with a peak and with ear flaps. This headdress has now developed into the high bearskin hat of the British Grenadier Guards and other regiments, but this is worn only on parade.

GRENFELL, SIR WILFRED THOMASON (1865-), the guiding genius of Labrador. Whether he is acting in the capacity of medical missionary, clergyman, judge, doctor, policeman or volunteer postman, he performs his duties with a vigor and enthusiasm that has made his influence felt in every part of Newfoundland and Labrador.

Brought up in an influential English family, for he was born near Chester and was educated at Oxford and at London Hospital, he finds in Labrador "the joy of the opportunity of service." In 1889, under the auspices of the Royal National Mission to Deep Sea Fishermen, he fitted out a hospital ship and accompanied the fishermen of the North Sea on their cruises from the Bay of Biscay to Iceland. After three years in the work there, he began his activities in Labrador. Along the coast of Saint Anthony, at Battle Harbor and Harrington Harbor in Newfoundland, and at Indian Harbor in Labrador, he built hospitals, each of which is the home of a resident doctor and nurse. The mission headquarters are at Saint Anthony, where Dr. Grenfell lives; here also he established an orphanage.

WILFRED T. GRENFELL
The "good angel" of Labrador

His little hospital ship, the *Strathcona,* is his summer home, and in June of each year he starts on his cruise along 1,500 miles of a bleak, inhospitable coast, and he goes ashore at the scattered villages. He gives the royalties from his books—*Adrift on a Pack of Ice, Off the Rocks, Labrador* and *Down to the Sea* —and the income from his lectures, as well as the best of his mind and life to the fisherfolk of Labrador. In 1909 he married Anna Elisabeth MacClanahan of Chicago, Ill. R.D.M.

GRENOBLE, *gren no' b'l,* one of the strongest fortresses in France, the capital of the Department of Isere, seventy-five miles southeast of Lyons. It is beautifully situated in the valley of the Isere River, surrounded by hills and divided by the river into an ancient and a modern city. The manufactures consist of gloves, of which about 800,000 dozen pairs are produced annually, cement, liquors, straw hats, furniture and leather. In the beautiful church of Saint Andre is the monument of Bayard, the knight "without fear and without reproach" (see BAYARD, PIERRE DU TERRAIL). Grenoble occupies the site of the ancient town of Cularo, the name of which was changed to Gratianopolis by Gratian, who fortified it in the fourth century. Population in 1911, 77,438, of whom more than 18,000 were engaged in the glove industries.

GRESHAM'S LAW, the principle that "bad money drives out good," was first stated by Sir Thomas Gresham, founder of the Royal Exchange in London, in 1560. Whenever a government issues money that does not equal in value the amount marked on it, people who have good coins in their possession will save them and spend the poor money. In addition, foreign merchants will demand payment in good money, so that after a time there may be none left in circulation but the inferior issue. If coins of full weight are put in circulation with coins that are of light weight or badly worn, the good coins may be hoarded, and soon nothing will be found in the market but poor and defaced currency. This fact appears to have been first noticed in the thirteenth century, when dishonest dealers chipped off particles from gold and silver coins, which were circulated until they were so thin that they were easily broken. Gresham states the principle as follows:

> "Where by legal enactment a government assigns the same nominal value to two or more forms of circulatory medium whose intrinsic values differ, payments will always, as far as possible, be made in that medium of which the cost of production is least, the more valuable medium tending to disappear from circulation."

The most striking instances of the working of Gresham's law are found in Mexico and some of the other Spanish American countries, where paper money has caused the disappearance of all metal coins. In 1896, when there was a possibility in the United States that bimetallism might be established and that silver might circulate on a legal parity with gold, the owners of gold coins hoarded their supply until the defeat of the proposed plan at the polls. See MONEY; BIMETALISM. A.E.R.

GRET'NA GREEN, a village in Dumfriesshire, Scotland, eight miles north of Carlisle and just over the English border. It is noted for runaway marriages formerly celebrated there under the lax Scots law, which was satisfied merely with mutual promises of the man and woman made in the presence of witnesses. The fugitive lovers were united in marriage by the clergyman in very speedy manner; and the fee, very flexible in amount, was demanded when the service was about three-quarters performed, so as to insure payment before the possible arrival of irate parents. There were four places in Gretna Green where these marriages took place. However, this practice was discontinued by an act of Parliament in 1856, which declared that no irregular marriage in Scotland should thereafter be valid unless one of the parties had resided in Scotland for twenty-one days. To-day any town to which eloping couples flee to get married is popularly termed Gretna Green.

GRÉVY, *gra ve'*, FRANÇOIS PAUL JULES (1807-1891), a French statesman and the third President of the French republic, was born at Mont-sous-Vaudrey, Jura. He studied law in Paris, was admitted to the bar in 1837, and became a brilliant member of the profession. In 1868 he was elected a member of the Chamber of Deputies, which corresponds to the American House of Representatives, and in 1873 became president of the National Assembly. In 1879 he was elected President of the republic, upon the resignation of President MacMahon. He entered on a second term of office in 1885, but in 1887 was compelled to resign on account of a scandal involving his son-in-law. Mr. Grévy was an able, conscientious and popular statesman, and successfully handled the problems of his administration.

GREY, *gray*, ALBERT HENRY GEORGE GREY, fourth Earl (1851-), a British statesman and colonial administrator, Governor-General of Canada from 1904 to 1911. Grey was educated at Harrow and at Trinity College, Oxford, where he was graduated in 1873. Five years later he was elected to the House of Commons, but was unseated on a technicality. He was again elected in 1880, and sat until 1886. In 1896 and 1897 he was administrator of Rhodesia, and he became the close friend and supporter of Cecil Rhodes in his plans for consolidating British South Africa. From 1898 to 1904 he was a director of the British South Africa Company, and from 1899 to 1904 was lord-lieutenant of Northumberland. During the seven years he spent in Canada he became very popular. He was interested in the social and economic progress of the Dominion, and took an active part in important public movements, notably the campaign against tuberculosis and the conservation movement. He sought to promote Canadian patriotism, and at the same time to stimulate the sense of loyalty to the British Empire.

For several generations Earl Grey's family has had more or less intimate connection with Canada. His sister Mary was the wife of the fourth Earl of Minto, his predecessor as Governor-General of Canada. His uncle, Henry Grey, third Earl (1802-1894), was British Colonial Secretary from 1846 to 1852. It was

due to him in no small degree that Canada won responsible government when it did. The first Earl Grey (1729-1807) was a British general who held high commands in America during the Revolutionary War, and the second Earl, grandfather of the fourth Earl, was the famous Prime Minister. G.H.L.

GREY, CHARLES, second Earl (1764-1845), an English statesman, whose greatest work was the passage of the Reform Bill of 1832. He was born at Fallodon, in Northumberland, studied at Eton and at King's College, Cambridge, and like most young men of his class, completed his education by traveling on the Continent. In 1786 he entered Parliament, where he at once joined Charles Fox, to whom he ever afterward remained faithful. He helped to manage the impeachment of Warren Hastings, and as early as 1797 began to bring forward petitions for electoral reform. In the "all talents" ministry of 1806 he was first lord of the admiralty, and on Fox's death Secretary of State for Foreign Affairs, and he helped to put through the bill for the abolition of the slave trade.

From 1807 to 1830 he was a member of the Opposition in the House of Lords, to which he had been admitted in 1807; but in 1830 he came into power as Premier. At once he began the struggle to put through a reform bill which should equalize suffrage and do away with the so-called "rotten boroughs," but opposition was fierce, and disturbances throughout the country were the result. Twice the bill was passed by the Commons and rejected by the Lords, and in 1832 Grey demanded of King William IV that he create enough new peers to put through the bill. William consented, but the mere threat of such action was enough to change the attitude of the Lords, and on June 4, 1832, the Reform Bill was passed.

Grey retired from office in 1834 and spent the rest of his life in retirement. While not ranking with the greatest statesmen England has produced, he holds a permanent place in the history of his country. A.MC C.

GREY, EDWARD, VISCOUNT GREY OF FALLODEN (1862-), until 1916 known as Sir Edward Grey, a British statesman and diplomat, appointed Secretary of State for Foreign Affairs in 1905. The appointment was severely criticized at the time, for Grey was then almost unknown to the public. In 1885, shortly after taking his degree at Balliol College, Oxford, he entered the House of Commons as the Liberal member for Berwick-upon-Tweed, and from 1892 to 1895 he was Under-Secretary for Foreign Affairs in the Gladstone and Rosebery ministries. His interest in politics, however, was popularly supposed to be somewhat languid, and he was better known as an amateur tennis champion, an enthusiastic fisherman and a lover of all outdoor sports. Between 1895 and 1905, when the Conservatiyes were in power, Grey continued to sit in the House as a private member. Always inclined to be reticent, he took small part in the discussion of public questions, except when foreign affairs were under consideration, but he seems to have won recognition for his abilities from his fellow-members.

SIR EDWARD GREY

It is no injustice to Grey to state that the public at first had little confidence in him as Secretary for Foreign Affairs, yet within a few years he was recognized not merely as one of the strongest men in the Cabinet but as the commanding figure in European diplomacy. Grey took office at a critical time, and between 1905 and 1914, when the conflict did break out, there were several occasions when it seemed as if a general European war were almost unavoidable. In each of these crises Grey was conspicuous, particularly in 1912, when his influence led to the London conference of the powers to consider the Balkan question. He presided at the conference, and to a large degree he was responsible for the agreement concerning Albania. Thereafter he stood second to none among the diplomats of Europe. In 1914 Grey was called on to play a difficult rôle in the complicated negotiations preceding the War of the Nations (which see). In 1916 Grey was created an earl, but by special permission of the king was allowed to take the lower rank of viscount "for personal and family reasons." It was generally assumed that the change was made in order to prevent confusion with Earl Grey, the former Governor-General of Canada; the two Greys are not related. W.F.L.

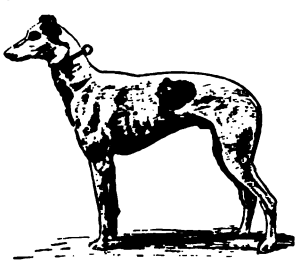
GREY, LADY JANE (1537-1554), known as "the nine days' queen," was a woman of rare accomplishments whom misfortune overtook at

every turn. She was the granddaughter of Henry VII of England, and daughter of Henry Grey, afterwards duke of Suffolk. At the age of sixteen she was married to Lord Guilford Dudley, the son of the duke of Cumberland.

LADY JANE GREY

Edward VI, who died in 1553, on his deathbed settled upon Lady Jane Grey the succession to the crown. He was influenced to do this by the persuasions of Cumberland that if the crown should descend to Mary, the work of the Reformation would be undone and the liberties of the kingdom would be endangered. The news was received by Lady Jane with unwelcome surprise, as it was by the people later, and it was long before she could be induced to accept the dignity. Edward died on July 6, and the news of his death was kept secret for four days, until after Lady Jane had been proclaimed queen. However, within less than two weeks after the proclamation Mary's claims had been recognized, and Lady Jane was imprisoned in the Tower of London. She and her husband were beheaded the following February, amid universal sympathy and compassion.

GREY'HOUND, a tall, slenderly-built dog, which hunts by sight, not scent. It is known as the fleetest of dogs, and on level country it can outdistance the horse. There are several varieties, some long-haired, others short-haired, but all are distinguished by a long, strong muzzle, very low forehead, short lips, bright eyes, long, thin legs, small muscles and contracted belly. The name does not refer to color, although many are dark grey, but is derived from the Icelandic word *grey,* meaning *dog.* The American greyhound was used, especially in the West in earlier days, for hunting jackrabbits, pronghorn antelopes and coyotes. The English greyhound is used to hunt hare. Other varieties are the Irish greyhound, to whose development clubs are devoted; the Russian wolfhound, the Scotch deerhound, the Italian greyhound and Persian *long dogs.* See Dog.



THE GREYHOUND

GRIEG, *greeg,* Edvard Hagerup (1843-1907), one of the most universally popular and beloved of modern composers, through whose influence Norwegian moods and Norwegian life have pervaded the world of music. One critic has called him the "Chopin of the North," and all authorities unite in declaring him one of the most original of the modern geniuses in the musical world.

Grieg was born at Bergen, Norway, and studied at Leipzig and Copenhagen. He made several triumphant concert tours through Norway, Italy, Germany, France and England, but he preferred to devote himself almost entirely to composition, rather than to recitals. His compositions are noted for their brilliant and effective local coloring; his music is filled with the enthusiasm and vigor of Scandinavian life, and many of his themes are drawn from Norwegian folk stories and national airs.

Although physically an invalid almost his entire life, an exuberant joyousness that ordinarily comes only with health permeates his works. His gift to posterity consists in 125 songs, which but two or three masters have equaled and which his wife inspired and interpreted. Among his other famous compositions are the *Peer Gynt Suite,* his *A Minor* for pianoforte and his *Sonata* for pianoforte and violin in F Major.

GRIMMS' FAIRY TALES. What joy and entertainment such stories as *Hänsel and Gretel, Rumpelstiltskin, The Goose-Girl, Tom Thumb* and *Snow-White* have furnished to boys and girls, who for nearly a century have been reading these fascinating tales collected by two brothers, named Grimm. During the first half of the last century these brothers went out among the country people of their fatherland, Germany, and collected all the fairy stories they heard. These were stories that had been told by German mothers for years, but had never been written. The Grimms were grave and learned men whose original wish was to produce books for students, but they made themselves famous forever when they published the fairy tales which they had collected. The stories, which were written in German, have been translated into all the principal languages of the world, and have made the name of the brothers Grimm as well known in

America as it is in their native land. The stories are short and simple tales about beautiful maidens and kings or princes who always "live happy ever afterwards," but even an older person, in whom the blessed gift of imagination has not died, can enjoy them as much as a child.

Jakob Ludwig Grimm (1785-1863) and **Wilhelm Karl Grimm** (1786-1859), the brothers Grimm, as they are generally called, were not in the least like the sort of people one would expect to find telling fairy tales. Both were sober, industrious scholars, born in Hanau, Germany, who became professors in Berlin after receiving their education at the University of Marburg. In 1837 they were among the seven professors who protested against the abolition of the constitution by the king of Hanover, and both were banished for a short time. Much of their writing was along scholarly lines; some of Jakob's work is especially important, for he published a German grammar of four volumes in 1819, which laid the foundation for historical investigation of the language. When writing their fairy tales they used the fictitious name of GAMMER GRETHEL, but their *Kinder und Hausmärchen* is generally known as *Grimms' Fairy Tales,* where the authors' fame rests on these stories alone. E.C.

GRIS-NEZ, *gre na',* CAPE, the point of France nearest to the English coast, the distance across to Dover being less than twenty-one miles. It is at an equal distance from Calais and Boulogne, in the Department of Pas de Calais. The headland is bare and grayish, hence the name, which means *gray nose.* On it stands a lighthouse with a revolving light 233 feet above the sea, which may be plainly seen from England. It is to this that Matthew Arnold, in his *Dover Beach,* refers when he says—

On the French coast the light comes, and is gone.

This point was attacked by the Germans in the War of the Nations, when, in 1914, they repeatedly attempted to capture Calais. From it, had possession been obtained, their great guns, shooting twenty-three miles, could have bombarded the English coast and controlled the English Channel.

GROM'WELL, the name commonly applied to plants of the borage family, having a funnel-shaped corolla which conceals the shorter stamens and seeds of stony hardness. Formerly medicinal properties were ascribed to these plants, which, however, were wholly imaginary. The common gromwell is found in dry, gravelly places in Europe, Asia, the United States and Canada. It has an erect stem with many branches, pointed leaves and small flowers. There are about forty species of this plant, which are common throughout all temperate zones; in America are eight or ten of these. Some have roots which produce a red dye similar to alkanet.

GRONINGEN, *gro'ning en,* the capital of the province of the same name in Holland, and one of the most important commercial centers in that small country. It is situated ninety-two miles north of Amsterdam, at the junction of the rivers Hunse and Aa, and is connected by canal with the Dollart Inlet, twenty-two miles to the northeast. The city is crossed by numerous canals and has extensive docks. There are important manufactures of textiles, sugar, furniture, cigars and tobacco, lumber, machinery and gold and silver ware. Its marketplace is one of the largest in Europe. Groningen was an important member of the Hanseatic League (which see) as early as 1282, when it was a strongly-fortified city. Maurice of Nassau captured it in 1594 and annexed it to the Netherlands. Population in 1910, 75,341.

GROSBEAK, *grose'beek,* a general name for various beautiful birds of the finch family, whose beaks are so thick they can open even the stones of cherries. The name was derived from the old French word *gros,* meaning *thick,* or *strong.* The rose-breasted grosbeak, which is seen throughout Eastern North America from Southern Canada to Panama, is one of the prettiest of the species. It has a sweet, joyous little song. The farmers of Pennsylvania call this bird *the potato-bug bird,* because it feeds on destructive potato beetles, as well as on flies, wasps and grubs. The male is a little smaller than a robin, is largely black, with white lower parts and a beautiful rose-red breast. Its blunt beak is yellow. A western species is called black-headed grosbeak.

GROSBEAK AND NEST

In the Southwestern United States is found the shy, handsome blue grosbeak. In solitary regions of Northwestern America, the brown and yellow evening grosbeak feeds on buds

and seeds of maples, evergreens and elders. Its song is a "jerky" warble. It received its name from the belief that it sang only in the evening. It does sing in the daytime, however, but only in the nesting season. The hardy pine grosbeak is common in pine and juniper woods of the Canadian provinces. This bird, with rose-red plumage, mixed with slaty gray, is also sometimes seen in Northern United States.

One species of grosbeak is called *hawfinch* in Europe. In America the cardinal is sometimes called grosbeak. See CARDINAL BIRD.

GROTE, GEORGE (1794-1871), an English historian who chose ancient Greece as his particular theme. He was eminent also as a philosopher and politician, and was a worker in behalf of university education.

His first published book was *The Statement of Questions of Parliamentary Reform,* which advocated popular representation, vote by ballot, and short Parliaments. In 1831 he published his important book, *Parliamentary Reform,* an elaboration of his *Statement.* However, the work which brought him greatest fame was his *History of Greece,* which appeared in twelve volumes between 1845 and 1856; it is a comprehensive study of Grecian history up to the death of Alexander. He later turned his attention to the study of Greek philosophy, which resulted in two books; he published the one on *Plato,* but that on *Aristotle* was destined to remain unfinished. Grote is buried in Westminster Abbey, near the grave of Macaulay.

GROTIUS, *gro'shius,* or **DE GROTT,** *de groht,* HUGO (1583-1645), a Dutch jurist, theologian, statesman and poet, and the honored founder of the science of international law. He was educated at the University of Leyden, taking his degree in his fifteenth year. In 1613 he was made chief magistrate of Rotterdam; in 1619, as a leader of the Remonstrant doctrine which is opposed to strict Calvinism, he was condemned to life imprisonment at Loewenstein, but escaped, with the assistance of his wife; and from 1635 to 1645 was Swedish ambassador to France. His chief work, *On the Law of War and Peace,* is considered the basis of international law, and has been widely used as a textbook. His other writings include some able translations in verse from the Greek authors and some brilliant Latin and Dutch poems. See INTERNATIONAL LAW.

GROUARD, *groo'ard,* a town in the central part of Alberta, in the Peace River country, at the western end of Lesser Slave Lake. It is on the Edmonton, Dunvegan & British Columbia Railway, 250 miles northwest of Edmonton and sixty-seven miles southeast of Peace River Crossing. In the vicinity of Grouard are coal and clay deposits, and there is also abundant lumber. Whitefish are plentiful in Lesser Slave Lake. The Peace River District is the last extensive area in Western Canada where homesteads may be obtained, and Grouard has a Dominion land office. Grouard is the natural supply center for the eastern part of this district, and in spite of the lack of adequate transportation facilities to the present time it has grown rapidly since 1911, when its population was only 447. In 1914 the town police census showed a total of 1,492, and with the westward extension of the railway the town is destined to greater importance. The town was named in honor of Bishop Emile Grouard (born 1840), a French Roman Catholic priest who came to Canada in 1860, became a missionary under Archbishop Taché and in 1902 was consecrated Vicar Apostolic of Athabaska.

GROUND HOG, the name applied to an active member of the squirrel family, known also as the *woodchuck,* and recognized by its long, coarse fur, which is blackish or grayish above and chestnut-red below, and by its

THE GROUND HOG
As a weather prophet he is credited with powers he does not possess.

short, thick legs, bushy tail, broad, flat head and long whiskers. The ground hog is about the size of a house cat. It is a North American resident, ranging from Hudson Bay to South Carolina and west to Nebraska. Its home is burrowed in fields, on the hillsides or under rocks in the woods, and is divided into several compartments. That no water may enter its domicile, the animal always burrows on an upward slant, throwing out the dirt with its sharp-clawed forefeet and scraping back with the hind ones.

Red clover and alfalfa and early garden vegetables are relished by this active little creature. When it leaves home for a meal, it first squats on its haunches before the door, to take a survey of the premises, turning its sharp eyes and ears in all directions for sights and sounds of danger. If the way is clear, off it bounds to the field or garden. During the fall and winter, between late September and March, the ground hog retires to its burrow for a long winter's sleep (see HIBERNATION).

There is a tradition, absolutely valueless, that on the second day of February it emerges from its burrow to view the weather conditions. If the sun is shining and the ground hog can see its shadow, it is a sign that spring is still six weeks off, and the wise little animal goes back to bed to escape continued cold weather. The flesh, especially that of the young ground hog, has an agreeable flavor. The name *ground hog* is self-explanatory; woodchuck is a corruption of *weejack,* which is derived from the Cree Indian name *otchoch.*

GROUSE, *grous,* a group of dull-plumaged, scratching game birds common in the northern parts of America, Europe and Asia. In addition to those shy, wily drummers of woodlands, the grouse proper, this family includes the bobwhite, or quail, capercailzie, ptarmigan and partridge, each described under its title in these volumes.

General Characteristics. Like fowls, grouse have four toes, the hind one raised above the ground. Feathers conceal the nostrils and fill the nasal groove. As these birds frequent high altitudes, most species have feathered legs to keep those parts from being frozen. They have well-developed breast muscles, which are the most edible portions of the birds. The heads of grouse are high at the rear and contain a wonderfully-developed brain, and the rare intelligence shown by the birds in eluding sportsmen makes the chase for them interesting. It is the habit of grouse to lie hidden until the huntsman's trained dogs are upon them and then to fly off rapidly with a great whirring of their stiff-feathered, concave wings. Under such circumstances a man must be cool and quick to shoot the bird.

In breeding season the males become fierce and fight each other viciously after dancing, booming, drumming and performing before the hens. The victorious male then mates with all the females of the "harem" for which he has fought. As soon as the females begin to sit, however, in their well-hidden nests on the ground, the male leaves them alone to take entire care of the young. There are usually from ten to fifteen rich buff, brown-dotted eggs, which hatch into downy, brown birds. These chicks leave the nest almost immediately after breaking from the shell. When the brood is in danger, the mother grouse gives a shrill call and the chicks quickly scamper to hiding places; she then pretends to be lame to attract attention to herself and to lead the intruder away from her babies, but when the enemy approaches too close she quickly flies away. When the young grouse no longer need care, father grouse returns and joins the flock, or *covey.*

In the summer, grouse feed chiefly on insects and berries. In autumn, grainfields are frequently visited, for seeds are added to their diet, and in winter, when snow covers the ground, catkins, leaves and buds constitute the food of grouse families.

Ruffed Grouse. One of the most important American game birds is the superb ruffed grouse, the *pheasant* of the South, the *partridge* of woods of the North. It is a handsome brownish bird, nearly a foot and a half long.

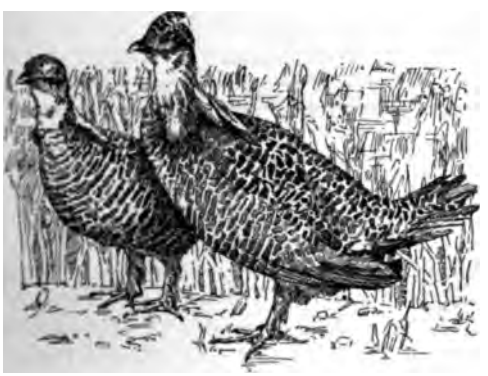
THE RUFFED GROUSE

On each side of the neck is a ruff or tuft of shiny, black feathers. The range of ruffed grouse is the Eastern United States and Southern Canada, west to Minnesota, south to Georgia, Mississippi and Arkansas. It is famous alike for its delicious, tender flesh and

its strange, thundering love song, the *thump-thump rup-rup r-r-r-r* which, once heard, is not easily forgotten. This bird, strong of wing, vigorous, wily and watchful, is well fitted to fight for existence. But the desire of sportsmen is rapidly decreasing the ranks of ruffed grouse, and as the birds do not migrate, the states in which they appear must strengthen existing game laws to prevent their extinction.

The *spruce grouse,* which was once common in Michigan, the Adirondacks of New York and Northern New England, is another family of grouse which is rapidly being destroyed by hunters. *Franklin's grouse* and the *dusky grouse* of Northwestern United States and Canada are called *fool hens,* because they are so unsuspicious that they stand curiously watching an approaching enemy and so are easily caught or shot.

Prairie Chicken, or Pinnated Grouse, a bird of the open prairie, another noble member of the grouse family once numerous throughout the Central United States, but now almost exterminated in many regions. It is



THE PRAIRIE CHICKEN

also found in parts of Canada. The call of the prairie chicken is loud and hollow, and almost as peculiar as the drumming of the ruffed grouse. On each side of the neck of the male prairie chicken is a large loose sac which can be inflated at will, to look like a great orange. At the back of the neck are tufts of long, black feathers. All these peculiarities are to attract the females at mating time. Unlike other grouse, prairie chickens migrate, and they can fly long distances.

Among species not mentioned above is the *sage grouse,* a game bird next to the turkey in size. M.S.

Consult Coues' *Birds of the Northwest;* Leffingwell's *Shooting on Upland, Marsh and Stream.*

GRUNT, an American species of game fish, so named from the sound it makes when removed from the water. It is sometimes called *drumfish, pigfish* and *redmouth.* This genus has about fifty-five species, and all have more or less orange and red markings inside the mouth. They are valued as important food fishes. The pigfish reaches a length of from twelve to fifteen inches, and is found on the South Atlantic and Gulf coasts, ranging as far north as Long Island Sound. It prefers sandy shores and is taken in seines or nets. In some places this species of pigfish is known as the "sailor's choice," a term denoting their preference for it.

GRUNTER. See GURNARD.

GUADALAJARA, *gwah thah lah hah'rah,* the capital of the state of Jalisco, Mexico, 380 miles northwest of the City of Mexico, was founded in 1531, and is the second city in the republic in size and importance. Its principal buildings are the cathedral, which dates from 1618 and contains a famous *Assumption* by Murillo; a mint, Episcopal palace, numerous scientific and educational institutions and a public library of 24,000 volumes. Its theater, the Degollado, is the second largest in America. Coffee is grown, and paper, Panama hats and leather are manufactured. There are also important steel and glass industries. Population in 1910, 118,800.

GUADALUPE HIDALGO, *gwah thah loo'pah e thahl'go,* TREATY OF, a compact between the United States and Mexico, entered into on February 2, 1848, at the close of the Mexican War. The negotiations were conducted at Guadalupe Hidalgo, a small town three and one-half miles north of the City of Mexico. By the terms of this treaty the United States secured the territory comprising the present states of California, Nevada and Utah, most of the present New Mexico and Arizona, and part of Colorado and Wyoming. The Rio Grande was agreed upon as the boundary between Texas and Mexico. In addition, the United States agreed to pay Mexico $15,000,000 and to assume the payment of all claims, not exceeding $3,250,000, held by American citizens against Mexico which had originated prior to the date of the treaty. See MEXICAN WAR.

GUADELOUPE, *gaw da loop',* an island of the West Indies and one of the principal French colonies, is noted for its fine quality of cocoa, sugar and coffee. It has an area of 619 square miles with its island dependencies, and is divided into two parts by a strait called

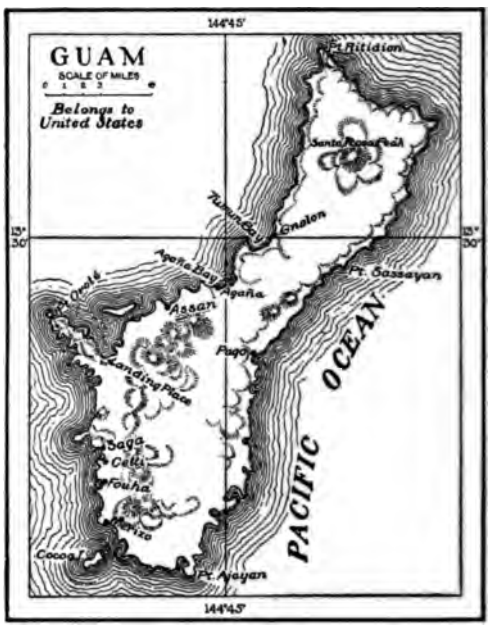
the Riviere Salee, or Salt River. The western part, called *Basse-Terre,* is mountainous and covered with forests. One of its highest points is Soufrière, a volcano 5,000 feet high, which is occasionally active. *Grande-Terre,* the eastern division, is flat and rises only about 450 feet above sea level. This portion is about thirty miles long and about twelve miles wide, and is composed mainly of coral and limestone. The climate is hot and not very healthful; the mean temperature is about 78°. Earthquakes and hurricanes are frequent, an especially disastrous earthquake having occurred in 1843.

The island is a department of France and is represented in the French government by one senator and two deputies. The small adjacent islands under the rule of the colony are Desirade, Maria Galante, Les Saintes, Saint Bartholomew and part of Saint Martin. The chief products include sugar, cocoa, coffee, bananas, tobacco and sweet potatoes, the revenues amounting to about $1,400,000 annually. The chief seaport is Pointe-a-Pitre, with a population of 17,000, the total island population being about 167,000. There are elementary schools and good roads. The island was captured and recaptured by the French and the English during their various wars, but at the treaty of peace which closed the Napoleonic era was finally ceded to the French.

GUAM, *gwahm,* or **GUAJAN,** *gwa hahn',* an island belonging to the United States, one of the group of Ladrone Islands, in a far-away spot in the Pacific Ocean, 1,500 miles east of Manila. It is about 210 square miles in extent, and has been described as the smallest and most isolated possession of the United States. Magellan first discovered the island in 1521, but it did not become a Spanish possession until 1561. By the Treaty of Paris, in 1898, closing the Spanish-American War, it was ceded by Spain to the United States. Since that time the island has made rapid progress. It is a regular port of call between America and the Philippines, and has become of special value to the United States since the opening of the Panama Canal, as it is expected to become a naval station of great importance. A freight line has also been established to export its products.

The island raises copra, spices, pineapples, cotton, coffee, sugar, tobacco and sweet potatoes. Agana, the capital, is becoming well Americanized, with elementary English schools. An agricultural experiment station has also been established by the Federal government. The temperature is mild and the climate comparatively healthful.

The chief executive is an officer of the navy, who is appointed by the President of the United States and who holds the title of governor. The total population of the island is about 13,000, and is composed largely of peaceable, intelligent blacks.



GUAM

Destined to become a naval stronghold of the United States in mid-Pacific waters.

GUAN, *gwahn,* a member of a family of game birds having four toes and blunt claws adapted for walking. It is related to the curassows, or turkeylike birds, and ranges from South and Central America into Mexico and Texas. It is about thirty inches long and generally brown or olive-green in color, with a long tail and only a narrow strip of feathers on its throat. There are several species of these birds, one of them, the *chacalaca,* ranging in Texas. This bird lives in large flocks and is easily domesticated. From Mexico southward

THE GUAN

it is considered a table delicacy, much as is the partridge in more northern latitudes.

GUANACO, *gwah nah'ko,* one of the four species of the wool-bearing animals of South American that belong to the family of camels, the other three being the llama, the vicuna and the alpaca. The guanaco and vicuna run wild, while the alpaca and the llama are domesticated. The guanaco is a large and heavily-built animal, with red, woolly hair, but is sure-footed and swift and looks much like a camel without a hump. The range of the guanaco extends from Patagonia and Tierra del Fuego to Peru and Ecuador, but it is chiefly found in Southern Peru. It supplies the natives of these countries with food and clothing, and the skins are used to make tents. See LLAMA; ALPACA; CAMEL.

GUANAJUATO, *gwah nah hwah'toh,* or **SANTA FE DE GUANAJUATO,** the capital of the Mexican province of the same name, noted for its silver mines, at one tifne the richest in Mexico. It is beautifully situated in a valley 6,200 feet above sea level, 165 miles northwest of Mexico City. The city was founded in 1554, and for many years was the center of terrific struggles between the natives of the province and the Spaniards. From a city of 100,000 inhabitants it has gradually declined, many of its silver mines, the chief source of revenue, having been abandoned as they were too deep to pay for working. Modern machinery and electricity are now putting new life into the mining industry, and silver is once again the most important local product. There are also woolen, cotton and flour mills, and manufactures of chemicals and silverware. Population in 1910, 35,682.

GUANO, *gwah'no,* a Spanish word applied to deposits of the excrement of sea birds, such as pelicans, penguins, petrels, cormorants and gannets, which live in large colonies. When thoroughly decomposed, these deposits form a valuable fertilizer, possessing large proportions of nitrate and phosphate compounds. Its use as such has been on the decline for a number of years, owing to the growing popularity of other fertilizers. The islands off the coast of Peru are the chief sources of the supply, but the deposits are becoming exhausted, and guano is being supplanted by cheaper fertilizers. The deposits found on the Chincha Islands at one time covered the surface to a depth of more than 100 feet. In 1840 the Peruvian government began exporting guano, and the supply there continued plentiful for thirty years. Guano has been found in many parts of the world, but it seldom occurs in quantities sufficient to pay for collection at a distance of more than twenty degrees north or south of the equator.

No definite rule can be laid down as to what kind of soil is most benefited by the use of guano. If careful analysis shows that the soil is weak in nitrates and phosphates, guano may be used to supply the need. It should always be thoroughly mixed with four or five times its bulk of fine soil before being applied.

GUARANTEE, *gair an tee',* an obligation created by warrant or contract to pay the debt of another in case the latter defaults in payment. The *guarantor* is the person making the promise; the person in whose interest the promise is made is the *principal,* and the *guarantee* is the person to whom the promise is made. A provision is made in the statute of frauds that no person shall be liable for the debt, default or failure of another unless a written agreement is signed by the guarantor, or his authorized agent, for this purpose. In the event of the guarantor being called on to pay the debt an indemnity or reimbursement against loss is usually provided for by bond. If there are a number of guarantors, and they are obliged to pay the debt, each must pay his agreed proportion.

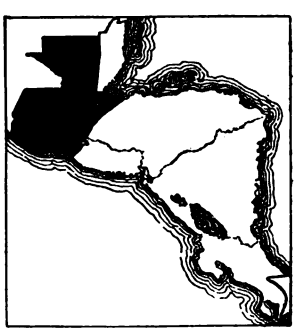
GUARDIAN, *gahr'di an,* in law, the legal representative and custodian of infants—that is, persons under the age of twenty-one. Parents themselves are called guardians *by nature* or *for nurture.* The courts appoint guardians when necessary. A guardian is not permitted to reap any benefit from his ward's estate, but must account for all profits. He can invest the money of his ward in real estate only by order of the court, and he can convert real estate into personal property only by a similar order. If he spends more than the interest and profits of the estate in the maintenance and education of the ward, without permission of the court, he may be held liable for the principal thus consumed.

A ward owes obedience to his guardian, which a court will aid the guardian in enforcing. A ward cannot marry without the consent of his guardian. He could not bring an action at law against his guardian, but might file a bill in court calling him to account. At the age of fourteen, the ward is usually entitled to choose a guardian, his choice being subject to the rejection of the court, for good reason, when he is entitled to choose again.

GUATEMALA, *gwah te mah' la,* a picturesque and beautiful tropical country, the largest and most northern of the republics of Central America. It lies wholly in the torrid zone, from about 13° to 18° north of the equator, between Mexico on the north and west, and British Honduras, the Gulf of Honduras, Honduras and Salvador on the east. On the south is the Pacific Ocean. It is exactly south of a line drawn through Saint Louis and New Orleans. Covering an area of 49,290 square miles, it is slightly larger than the state of New York. Its population of 2,119,000 in 1914 was but two-ninths that of New York, and only about twice that of its southeastern neighbor, Salvador, which is only about one-seventh as large.

The name Guatemala is probably of Aztec origin; some authorities translate it as *Land of the Eagle* or *Land of Forest,* while others connect it with the volcano Agua, interpreting it, *Mountain vomiting water.*

Climate, Land and Products. Guatemala is mountainous and hilly in most places. On the northeast coast is a hot, marshy, forested tract, still largely unexplored. It is a section partly of jungles, fever infested, and the home of poisonous snakes, but there are also dense forests of valuable mahogany, with magnificent orchids and rare and brilliantly-colored birds. Cacao is cultivated to some extent in that section, and bamboo, coco palms and rubber trees grow wild.



LOCATION MAP

Showing the position of the republic in Central America, and its comparative size among its neighbors.

The central portion is a high plateau surmounted by mountain ranges attaining an elevation of 11,000 feet at the highest point. In that section, on plains from 2,000 to 6,000 feet above sea level, the climate is temperate and healthful, with sufficient rain for agriculture. Coffee is the principal product of the country and is raised chiefly in these temperate regions. Over $12,000,000 worth of coffee is exported each year. Sugar cane, tobacco, cotton and tropical fruits are also cultivated in the lower regions. Ramie, henequen and other fiber plants are grown to some extent. Going higher, wheat, potatoes, apples and corn are the principal crops. Above 10,600 feet, in the colder regions, there is no agriculture, but there is some mountain grazing.

In the mountains bordering the plateau on the south are numerous volcanoes, most of them extinct. Notable among them is the famous Agua, one of the highest in Central America, its height being estimated as between 12,300 and 13,500 feet. It received its name because it throws forth great volumes of water and large stones, instead of fire.

Rivers on the Atlantic slope, though fairly long, are of little use as highways, except Motagua, which is navigable for 100 miles. Those on the Pacific slope dash in torrents down steep slopes to a narrow plain on the coast. There are numerous lakes, those in the mountains being very beautiful. Lake Yzabel, in Northeastern Guatemala, is navigated by steamers. Lake Peten, in the north, is the largest. All these waters are well stocked with fish, but fishing is attended with danger, for there is always the chance of a fierce puma or jaguar jumping out of the forests, and alligators and serpents are numerous.

Silver, gold, copper, iron and lead mines are worked to some extent, and the mining industry is encouraged. Marble is abundant.

Transportation and Commerce. As most of the important industries in Guatemala are owned by German and American companies, so also are the more than 500 miles of railway. Outside of the railways most of the traffic of the republic is on mule-back, and although there are a few good roads and many bridges, transportation facilities are still inadequate.

On the Atlantic side of Guatemala the chief ports are Puerto Barrios and Livingston. Vessels of the United Fruit Company run from New York and New Orleans to the former, and steamers of the Hamburg-American line from Hamburg touch both ports. The chief ports on the Pacific side are San Jose, Champerico and Ocos, which are visited by the Pacific Mail line and the Mosmos line; the opening of the Panama Canal has made access to these ports easier for steamers from the east. Yearly exports average about $10,500,000, and imports are very nearly as much.

People and Government. About sixty per cent of the people are pure Indians, descendants of a highly-developed race whose origin has not as yet been determined. It is thought they are allied to, or were the same

ıe Toltecs or Aztecs of Mexico (see). There are a number of Spanish-Ameri- Germans and other foreigners, but the ı population does not greatly exceed ; nearly all the remainder are half-

ıough, as in all other Central American ries, the natives are shiftless and lazy, mala has the best system of education e Central American states. Education ɛ and compulsory. To bring people of lands to the country immigration is en- ged by free distribution of uncultivated to immigrants. The prevailing religion is n Catholic, but all creeds are tolerated. ıh is very generally spoken.

government of Guatemala is in the of a President and his Cabinet, a Na- Assembly and a Council of State. A itution, adopted in 1879, is the basic law republic. For administration of govern- Guatemala is divided into twenty-three tments, or small states.

ory. The history of Guatemala is prac- a part of that of all Central America ENTRAL AMERICA). It formed a part of ıh territory, became free in 1821, and for rt time belonged to Mexico. It joined the other states in the Confederation of al America, but has been independent 1833.

temala, or **Guatemala la Nueva,** some- also called SANTIAGO DE GUATEMALA, is ıpital of the republic and its commercial . The city is situated in a rich plain

A SCHOOLHOUSE IN GUATEMALA
walls are built of upright poles fastened ıer with ropes made by women from hemp ves. The steep roofs are thatched. The room of such a building usually has no

-five miles from the Pacific coast and 5,000 feet above the sea. As it is located earthquake section of the country, most houses are of one story, therefore the with a population of over 90,000, covers ıparatively large area.

Guatemala is a rather handsome tropical city, with many modern conveniences. The chief place of interest is the great square, in which are located the old viceregal palace, the government offices, the cathedral, the archbishop's palace, the barracks, several schools and most of the stores. Public libraries are maintained by the city, and there are a number of hospitals, a national palace and a theater.

FORMER ROYAL PALACE
This building yet stands, at Antigua. It is an impressive reminder of the splendor of the ancient capital.

In this city are manufactured muslins, cotton, yarn, artificial flowers, embroidery and silver articles.

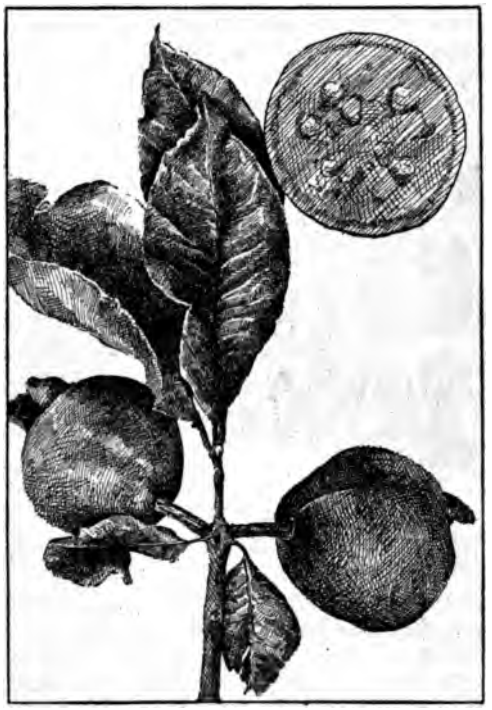
The present city of Guatemala is the third capital of the country to bear the name. The first two were destroyed by earthquakes. M.S.

Consult Winter's *Guatemala and her People of To-day;* Fife's *Guatemala and the States of Central America.*

GUAVA, *gwah'vah,* a small tree or shrub at one time known only in tropical Asia, but now cultivated and a source of income in the Southern United States. It is esteemed for its edible fruit, especially valuable for jellies and preserves. The species most commonly grown in Florida and the Indies is the *lemon guava.* It grows about twenty feet high, and the numerous branches bear blunt leaves two or three inches long. Following white fragrant flowers the fruits appear—roundish or oblong, smooth, yellow, and about the size of a hen's egg. The firm, flesh-colored, sweetish-sour pulp is filled with horny seeds. The thin, brittle rind, stewed with milk, makes a marmalade.

From over 15,000 guava trees in bearing in Florida and California about 355,000 pounds of fruit are produced yearly, valued at over $11,500. Florida leads in the production of this fruit. A *red guava,* bearing a beautiful, red-fleshed fruit, grows in the Indies, but is less

cultivated than the lemon guava, being more acid. The *strawberry guava,* bearing a small, claret-colored fruit, is excellent for preserves.



GUAVA
Fruit and cross section of same, and leaves of the tree.

GUAYAQUIL, *gwah ya keel',* the chief seaport of the republic of Ecuador, on the Pacific coast of South America. Through that city over $15,000,000 worth of exports pass each year, consisting chiefly of cacao, coffee, Panama hats, ivory nuts, gold, silver, quinine and hides. The imports through the port exceed $7,000,000 yearly.

Guayaquil is situated on the west bank of the River Guayas, forty miles above its entrance into the Gulf of Guayaquil. It lies on a low plain and is divided into two parts. The old part is a quaint place of crooked, unpaved streets, and at the water's edge merchants display their wares in canoes. The new part contains the residences of the well-to-do people and the most important places of business. The chief buildings are the cathedral, university, bishop's palace, town hall and hospitals. Through a lack of good drinking water and the presence of marshes behind the town, Guayaquil has been a place of fever, but sanitary improvements were started in 1913.

A railway from Duran, opposite Guayaquil, brings this seaport into touch with Quito, the capital of Ecuador, 165 miles northeast, high in the mountains. Telephones and electric cars facilitate communication among the population of about 80,000, as estimated in 1910. Telegraph wires and cables connect Guayaquil with other parts of the country and the world, and steamships from all countries enter its port. Boats running for short distances on the Guayas River and its branches connect Guayaquil with the surrounding country. Its harbor is well protected by a breakwater. Its shipyards rank among the best on the west coast of South America. In addition to shipping activities, Guayaquil has sawmills, sugar refineries, cotton and woolen mills, a foundry and a brewery, and soap, cigars, chocolate, ice, soda-water and liquors are manufactured. M.S.

GUELPH, *gwelf,* the county town of Wellington County, Ontario, an important manufacturing, distributing and educational center in the central part of the Ontario peninsula. It is on the Speed River, which here falls thirty feet and provides abundant power. Railway service is offered by the Grand Trunk and Canadian Pacific railways, which connect Guelph with Toronto, forty-eight miles east, Kitchener (formerly Berlin), fourteen miles west, and other points. Hamilton is twenty-eight miles overland to the southeast. Guelph was founded in 1827 by John Galt, the novelist, and was incorporated in 1877. Population in 1911, 15,175; in 1916, estimated, 18,000.

Guelph is the seat of the Ontario Agricultural College, the oldest and most famous school of its kind in Canada; its students, who number about 1,200, come from all parts of the world. In connection with the college is Macdonald Institute, a school of domestic science for girls. In addition to the power derived from the falls of the Speed River, Guelph's manufactures receive electrical power from Niagara Falls. The city's manufactured products, which have an annual value of $8,000,000 to $10,000,000, include pianos and organs, sewing machines, carpets, clothing, steel and wire goods, boots and shoes, and meat products. Stock-raising is one of the principal pursuits of the neighborhood, and Guelph's annual stock show is notable. The city owns the Guelph Junction Railway (fifteen miles long) as well as its street railway, electric light, water and sewer systems.

GUELPHS AND GHIBELLINES, *gwelf, gib' el inz,* the names of two great Italian political factions, in the thirteenth and fourteenth cen-

turies. These terms are corruptions of the German *Welf* and *Waiblingen*, party designations in Germany, said to have been used first in 1140 as battle cries in the battle of Weinsberg between the Welfs of Bavaria and the imperial line of Hohenstaufens, to whom belonged the estate of Waiblingen. In Italy, the names acquired a different meaning: the Guelphs referring to the Italian patriotic party, which demanded an Italy freed from German interference; the Ghibellines, the imperial party, which supported the domination of the German emperors in Italy. These factions came into prominence in the Lombard League of 1167.

To give a full account of the quarrels of Guelphs and Ghibellines would embrace the history of medieval Italy. After the fall of the Hohenstaufens (which see) the Ghibellines became the representatives of the aristocracy, and the Guelphs were the partisans of democracy and liberty. At the beginning of the fifteenth century the rivalry began to die out gradually, and came in time to denote mere family feuds.

GUERNSEY, *gurn'zi,* the second in size and most western of the Channel Islands, belonging to Great Britain and lying fifty-one miles south of the mainland at Portland. It is especially noted for its fine breed of cattle called Guernsey, the name of which was derived from the island (see CATTLE). The area of the island is about twenty-five square miles and the soil is unusually fertile. Wheat, barley, oranges, figs, melons, grapes and apples are extensively grown. Lines of steamers ply between Guernsey and Southampton, Plymouth, Weymouth and Cherbourg, and exports of agricultural products, fresh flowers and fisheries are heavy. The capital is Saint Peter Port, which is, except Saint Sampson, the only town on the island. Although the island is English, French is the prevailing language, for it was deeply-rooted when the Channel Islands were under the rule of France prior to 1204. The population of Guernsey is about 43,000, which is about one-half that of the Channel Island group. See CHANNEL ISLANDS.

GUIDO OF AREZZO, *ah ret'so* (about 990-about 1050), is called by many the father of modern music. He invented, or for the first time systematically used, the lines of the staff and the intervals between them, and thus fixed the principle of modern musical notation. He also introduced the names of the first six notes of the scale—*ut, re, mi, fa, sol, la;* these are the first syllables of six lines of a hymn addressed to Saint John the Baptist.

Guido was a Benedictine monk, and little is known of his life. The fame of his musical invention drew the attention of Popes Benedict VIII and John XIX, who invited him to Rome and did much to popularize the new system. He left writings explaining his musical doctrines.

GUIDO RENI, *gwe'doh ra'ne* (1575-1642), master in the Bolognese (Italian) school of painting, and generally known as GUIDO, was born at Calvenzano, near Bologna. His father, a musician of repute, desired to bring up his son to perform on the harpsichord, but at a very childish age Guido displayed his determination to devote himself to painting. At the age of nine he began his studies, and so rapid was his progress that when he became thirteen he already had won an enviable reputation.

Guido is particularly distinguished for the gentleness and sweetness of his characters and for his harmonious style of execution, although strength and originality are somewhat lacking, as is evidenced in his masterpiece, *Phoebus and the Hours Preceded by Aurora.* After the completion of this work so great was the demand for his art that he was obliged to refuse many commissions. Among his other admired paintings are his *Niobe* group, the *Venus de' Medici, Israelites Gathering Manna, Lot and His Daughters,* and *Fortune,* an allegorical picture several times repeated and found at Berlin, in the Capitol at Rome, and in the Louvre in Paris. He also left many etchings executed with much grace and freedom.

GUILD, *gild.* Perhaps the most interesting phase of the study of history is to observe how the tendencies which man displays to-day were shown in earlier times. There is no more striking example of an institution of the past resembling those of the present than the guild of the Middle Ages. In the present age people form societies for every conceivable purpose, for business, for pleasure, for religion, for politics, for mutual protection or advancement, for advocating or protesting against legislation. Considering the simpler state of political and social organization which prevailed at the time, the guilds were no less varied. We know them best as societies of merchants and workmen, but there were also religious guilds, military guilds and social guilds.

Merchants' Guilds. These organizations were more important in England than elsewhere; they

flourished from the twelfth to the fourteenth century. The members of any guild were usually all residents of the same town, and included both merchants who bought and sold and artisans who made their own products. The guild was often granted a monopoly of the retail trade in its town, with the privilege of taxing outsiders who brought in goods. Anyone could join it who was willing to share in the taxes of the town. So we see in this type of guild the seed of the policies of several modern organizations of widely-different purpose, such as societies to promote protective tariffs, labor unions to resist the immigration of foreign workmen, and civic leagues of business men and taxpayers.

Craft Guilds. In the days of the guilds the manufacturers were skilled workmen as well as owners of the goods which they produced. In each town all those who shared in a certain craft or trade, such as weaving, or gold-working, banded together to advance the standard of their work. The members were divided into three classes, according to their skill. First were the *masters,* who alone were entitled to buy materials and sell manufactured goods. They bought and sold at prices fixed by the organization, and their establishments were under the supervision of the guild, so that no inferior product might be turned out. The second grade was composed of *journeymen,* who received wages from the masters and lived with them. When their education was completed, each was required to construct a *masterpiece* before being declared a master, just as a candidate for the degree of Master of Arts in a modern university must write a *thesis.* The beginners at the craft were *apprentices;* for their work they received board and lodging.

The craft guilds were most important in the fourteenth and fifteenth centuries, but a few of them survived nearly to the nineteenth century. At the time of their greatest prominence it became more difficult for journeymen to advance to the grade of master, and the journeymen formed guilds of their own which were the forerunners of the modern labor organizations. The original craft guilds, on the other hand, bear resemblance to present-day associations of competing business men. A.MC C.

Consult Seligman's *Medieval Guilds;* Staley's *Guilds of Florence.*

GUILFORD, *gil'ford,* or **GUILFORD COURTHOUSE,** BATTLE OF, one of the last important battles of the Revolutionary War, fought on March 15, 1781. An American force had been recruited and placed under Nathanael Greene, while Cornwallis had charge of the British command. Greene joined Morgan, who had defeated Tarleton, the leader of the British cavalry, and together they retreated into North Carolina. Cornwallis followed, but failed to overtake them at once, owing to Greene's excellent generalship. A battle was finally fought at Guilford Courthouse, near the site of the present city of Greensboro, N. C., in which the Americans were defeated, but Cornwallis lost about 600 men. He then decided to go to Virginia, while Greene marched back into South Carolina and drove the southern divisions of the British forces back to Charleston. Cornwallis soon saw that no gain could be made by the British, and wrote to Washington asking what would be his terms of surrender.

GUILLEMOT, *gil'e mot,* the name applied generally to several species of birds belonging to the auk family, and especially to the common, or *foolish,* guillemot, so called because it permits itself to be captured rather than abandon the cliffs on which it breeds. This bird abounds in the Arctic regions of both hemispheres, and in the colder parts of the temperate zones, and during the winter migrates as far south as the Mediterranean Sea. It lays but one egg, which is pear-shaped, with an exceedingly thick shell, and is more than three inches long. The thick-billed guillemot inhabits the same localities as the common variety. The Pacific coast species is called the *erra.*

GUILLOTINE, *gil'o teen,* an instrument used for the purpose of beheading persons, introduced into France during the Revolution in 1792, on the suggestion of Dr. Joseph Guillotin, after whom it was named. The instrument consists of two upright posts, with a crossbeam at the top, the posts being so grooved as to allow the falling of a heavy steel knife, with a slanting edge, upon the neck of the victim, as soon as the cord holding it in place is released by the executioner. The guillotine is still the means employed in France for the execution of criminals.

THE GUILLOTINE

For a description of its use during the French Revolution, when hundreds of persons were

cruelly put to death, see that title. In Dickens' *Tale of Two Cities* the chapter "Knitting" gives a realistic word picture of the instrument.

GUILMANT, *geel mahN',* FELIX ALEXANDRE (1837-1911), a French organist and composer, whose influence upon organ music extended to many lands. He was a tireless worker. Indeed, so fast did he work, and so well also, that during one of his American tours organ pieces were written en route from New York to Philadelphia and completed before his arrival. His *Fugue in D Major* was written in a single evening and his *Second Meditation,* one morning before breakfast.

At the age of seven he began to compose music extemporaneously, and worked ceaselessly for twenty years before he developed his art to the high standard for which he became distinguished later. He was organist in many famous churches in France, and in 1896 accepted a professorship at the Paris Conservatory. Later he made several successful concert tours in Europe and America. Great as were his performances of standard works, he will be remembered for his own marvelous compositions. In his extemporaneous playing he had no equal. He composed eight organ sonatas, three masses, and organ pieces numbering into the hundreds. His *Liturgical Organist,* of twelve volumes, contains a wealth of material for the church service. He also edited an *Historical Organ Book,* containing examples of all the schools of organ playing.

GUINEA, *gin'i,* a name applied to portions of the west coast of Africa, bordering on the Gulf of Guinea and the Atlantic Ocean. Although the boundaries have never been clearly defined it is generally understood that Guinea extended from the River Gambia, in the north, to the southern boundary of Portuguese West Africa, and included Portuguese Guinea, French Guinea, Sierra Leone, Liberia, the Ivory Coast, Kamerun, Gabun, the French Kongo Coast and what is now the coast line of Belgium Kongo. The term Guinea is now practically confined to Portuguese Guinea.

The origin of the name is unknown, but it is probably derived from Ghinea, or Ginnie, a town and kingdom in the interior, on the Niger River, a commercial center in the eighth century. The name did not come into general use until the fifteenth century. Early traders divided Guinea into two countries, called Upper and Lower Guinea, the dividing line between north and south being somewhere in the Bight of Benin. See PORTUGUESE GUINEA.

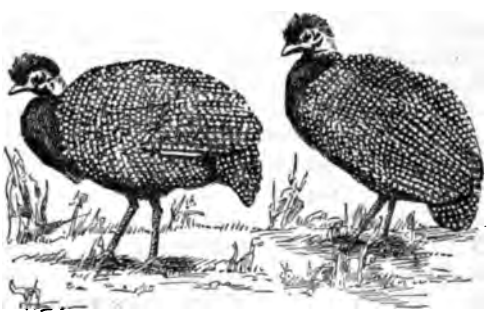
GUINEA, an old English coin, so named because it was first coined from gold found in Guinea in 1663, during the reign of Charles II. Its unit value is twenty-one shillings, or in American and Canadian money, $5.04. It was the principal English coin until 1817, when the sovereign was introduced. It is still customary, however, to estimate professional fees, such as the charges of doctors and dentists, and most charitable subscriptions, in guineas.

In literature there is frequent reference to this coin. Burns says:

> The rank is but the guinea's stamp,
> The man's the gowd for a' that.

GUINEA, GULF OF, a gulf on the west coast of Africa, an arm of the Atlantic Ocean. The name is applied particularly to that part of the coastal waters to the north of the Congo River and south of Cape Palmas. It includes the bay, or bight, which comes from the long sweep of the coast line, known as the Bight of Benin. The name *Guinea* is from that of the territory which once extended over the whole district. The Bight of Biafra, or Mafra, which is also included, contains the islands of Saint Thomas, Prince's and Fernando Po. The coast is low, and mangrove trees are the only sailing marks to guide navigators in this region. The inhabitants are true negroes.

GUINEA FOWL, a group of birds which originated in Africa and which are closely related to the pheasants. The domestic guinea fowl, which are quarrelsome and hard to raise, are unpopular because of their continued harsh



GUINEA FOWLS

cries; but these disadvantages are more than offset by the high price commanded by their flesh which, within the last few years, has become an expensive delicacy. Their eggs, which are small, spotted, and have a strong, thick shell, are also highly esteemed. These fowls have dark, slate-colored feathers, with regularly-arranged white spots.

GUINEA PIG, a little animal sometimes called the *cavy,* about six inches long. It makes an interesting pet for children and contributes largely to medical science. In their manner of life and in their food guinea pigs

GUINEA PIGS
At left, tortoise and white; at right, solid color, nearly red.

are much like the rabbits. There are several colors of these animals, known as the tortoise shells, the red, brown and white. They have small ears and no tails, and the sound they make is like a shrill whistle. Because they are naturally clean in habit and are strong, they are much used in bacteriological laboratories for experimental purposes. They will rest quietly in the hand while serum is being injected, and will resume feeding as soon as returned to the cage, apparently with only trivial discomfort. They are also used in vivisection, or the dissection of live animals, as the veins, arteries and most parts of the viscera are without the sense of touch and therefore have little sense of pain. Antiseptic precautions are used, however, and if the animal shows any signs of distress it is painlessly killed.

GUISE, *gweez,* a noble French family, the most famous branch of the House of Lorraine, several members of which had a conspicuous part in French history. The family acquired great political influence on the succession of the French king, Francis II, for his wife, Mary Queen of Scots, was a granddaughter of Claude of Lorraine (1496-1550), the first Duke of Guise. François of Lorraine (1519-1563), second Duke of Guise, was the leader of the Catholic party during the religious wars that devastated France in the reign of Charles IX. After winning several victories, he was assassinated while preparing for the siege of Orleans. His son, Henry I of Lorraine (1550-1588), third Duke of Guise, led the armies of the Catholics against the Huguenots (Protestants) in the reign of Henry III. The latter, jealous of the Duke's popularity and influence, caused him to be assassinated in 1588. After the death of Henry I of Lorraine, the Catholic forces were commanded by his brother Charles, Duke of Mayenne. Charles was defeated at Arques and Ivry by Henry of Navarre (Henry IV of France), but continued the struggle until 1596, when he made peace with the king. In 1675 the direct line of the dukes of Guise of the House of Lorraine became extinct, and the family estates passed to their nearest kin, the House of Conde.

GUITAR, *git ahr',* a stringed musical instrument with a hollow body and a neck, somewhat resembling the violin. The woods commonly used for the sides are maple, ash or cherry; hardwoods, such as ebony, beech, or pear, are employed for the neck and finger board; the bridge is of ebony. Many of the older specimens were adorned with inlays of rosewood and ornamented with tortoise shell and mother-of-pearl. The modern, or Spanish, guitar, has six strings, the three highest made of gut and the other three of silk spun over with silver. The Spanish guitar is always played with the fingers. The thumb sounds the deepest strings;

THE GUITAR

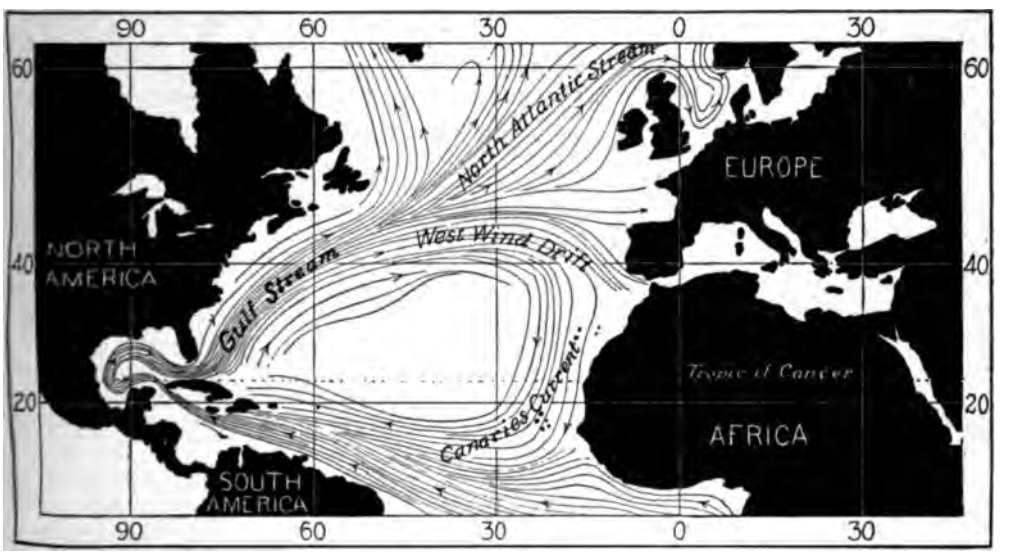
the first, second and third fingers sound the three highest tones, and the little finger rests on the sounding board.

The guitar was introduced into Spain by the Moors about the year 1288. By the beginning of the nineteenth century the Spanish guitar became a fashionable instrument on the Continent. Ferdinand Sor, a Spaniard, by means of his compositions brought the guitar into great popularity in England and succeeded in banishing the less perfect English guitar. Sor's most distinguished rival was Mauro Giuliani, an Italian. Other well-known composers were Legnani, Kreutzer, and Leonard Schuls; while Berlioz and Paganini were guitarists of note.

GUIZOT, *ge zo',* FRANÇOIS PIERRE GUILLAUME (1787-1874), a French historian and statesman, whose writings and lectures did much for the development of historical study in France, was born at Nimes. In 1805 he went to Paris to study law, but took up literature instead. In 1812 he became assistant professor of literature at the Sorbonne, and later in the same institution occupied the chair of modern history. His publicly-expressed political opinions led to his enforced resignation from the university. He

was elected to the Chamber of Deputies in 1830, and following the Revolution of the same year became Minister of the Interior, resigning a few months later.

In 1840 he spent some months in London as French ambassador to England, but was recalled by the king to form a new ministry. He was Prime Minister for the eight years preceding the abdication of Louis Philippe. His arbitrary refusal during this period to make concessions demanded by existing political conditions brought about his political downfall, and after the fall of Louis Philippe he fled to England. Upon his retirement from public life he devoted himself to literary work and produced a *History of the English Revolution*, *General History of Civilization in Europe*, *The History of Civilization in France* and *The History of France from the Earliest Times to the Year 1789*.



COURSE OF THE MAIN STREAM AND BRANCHES

GULF STREAM, the most important and the largest of the oceanic currents. It derives its name from the Gulf of Mexico, out of which it flows. For its origin, see the article OCEAN CURRENTS, in these volumes. The Gulf Stream issues from the Gulf of Mexico through the Florida Strait, and flows northward between the coast of Florida and the Bahama Islands. It follows a course parallel to the coast of the United States, from which it is separated by a narrow strip of cold water, known to sailors as the "cold wall." It flows past Cape Hatteras, and then moves northeastward until it reaches the southern edge of the Newfoundland Banks. Here it loses its identity as a distinct current and becomes merged into the general drift of the warm water which flows from the Atlantic in a northeasterly direction towards the coast of Europe, and is known as the Gulf Stream drift.

Description. When the Gulf Stream issues from the Gulf of Mexico it forms a well-defined current about fifty miles wide and about 2,000 feet deep, distinguished by its deep blue or indigo color and by its high temperature, which is several degrees above that of the surrounding water. The swiftness of the current diminishes as it progresses. Within the Florida channel it attains an average velocity of sixty-five miles per day; this decreases to fifty-six miles off Charleston, becomes thirty-six to forty-six miles off Nantucket and twenty-eight miles to the south of Newfoundland Banks. About 300 miles east of Newfoundland its movement is hardly perceptible.

Division. When the Gulf Stream drift approaches the European side of the Atlantic Ocean it divides into two parts, one stream going southward towards the western coast of Africa, and the other going northward along the western coast of the British Isles. This northern current then breaks into three branches. One branch runs through the strait between the Faroe and the Shetland islands, goes northward along the coast of Norway and enters the Arctic Ocean, where it spreads over a large area. A second branch flows to the west side of Iceland, while a third branch goes up the Greenland side of Davis Strait into Baffin Bay.

Its Influence upon Climate and Navigation. The mildness of the climate in Northwestern Europe as compared with the cold experienced in America in the same latitude has been for a long time attributed entirely to the presence there of the Gulf Stream. Some men of science, however, consider that this influence upon the climate has been exaggerated; that the mildness of winters in these regions is due more to the prevailing southwestern winds which bring moisture from the ocean. But it cannot be doubted that the exceptional mildness of these winds is caused by the great mass of warm water which is banked against the northwestern coast of Europe by the Gulf Stream drift.

Whether its influence upon the climate of Europe be great or small, the Gulf Stream fulfills another very important function. It keeps the harbors of Northwestern Europe free from ice all the winter and permits uninterrupted navigation all the year round. Its influence in this respect even in the Arctic Ocean has received quite recently a striking illustration. In the north of Russia, on the coast of the Arctic Ocean, not far removed from the most northern point on the European continent, there is a port which, being under the influence of the Gulf Stream, is free from ice all the year round. This is the port of Ekaterina (which see), situated 68° N., which has been connected with Petrograd by a railway 700 miles long, built in 1915 during the progress of the great War of the Nations. This, the most northern port of Russia, is the only one free from ice and therefore open to navigation all the year round. Archangel, Russia's other northern port, considerably farther south and east, is icebound half of each year. O.B.

Consult Rlker's *The Power and Control of the Gulf Stream.*

GULLS, *gulz,* birds that are known as long-winged swimmers, living in almost all parts of the world. Though the ocean is their proper home, yet they may be seen on interior waters, near the great lakes and smaller bodies of water. Gulls pick their food from the surface of the water and do not plunge, like the terns. Gulls in large flocks on large bodies of water will follow passenger steamers for hours at a time and will eagerly swoop down to the water for food thrown overboard to them.

The plumage is pearl-blue, brown or black, varying with the season and the age. The small gulls that live near lakes are content with a diet of worms, but the large ones are as voracious, size considered, as are and eat not only fish but useful bi are also scavengers, feeding on an whether putrid or fresh. The lar backed gull is a strong, savage bird a particularly to Europe. The black-h the herring gulls make their nests i

GULLS

The great black-headed gull, and h great black-backed gull.

in wet and swampy places, and b high enough to be free from the w kittiwake gulls build their seaweed wild and rocky places and are so nam their call sounds like "kittiwake." or seaswallow, belongs to the famil the black tern being one of the mos of the birds on inland waters. See E TERN.

GUM, the name applied to a widely-differing substances of a mc adhesive nature, which are produced sap which flows from certain trees, s plum, peach and cherry. True gum in water but not in alcohol. It is wi and has a faintly spicy taste. Man substances which are used in the m of perfumes and incense are classed gum arabic, of which there are eig varieties, obtained from the Senega Western Africa, is the best known Cherry-tree gum is used in the manu hats, to stiffen felts. Benzoin and s substances are also called gums, bu more correctly classed as balsams. used as mixing agents in pharmacy medium for obtaining cultures in ba See GUM ARABIC; BALSAM.

Chewing Gum, a form of gum r pleasing to the taste by sweetening i ing. It appears on the market in s at a cent apiece, or in candy-coa The gum-chewing habit is more pop

United States than in any other country. It sweetens the breath, and because it increases the flow of saliva it may slightly aid digestion; to a small degree it helps to preserve the teeth.

Black spruce gum resin was first used for chewing gum, but the gum resins of other forest trees are now used, chicle gum from the sapodilla tree being employed most extensively.

Chicle is a tough, firm, fragrant gum, nearly white when fresh and clean, but it is rarely pure. As the sticky sap is being gathered, it catches all the bugs and flying things which come to it before it hardens. Manufacturers of chewing gum try to remove these foreign substances, but without complete success. The resin is chopped into small pieces, cooked, sweetened, flavored with peppermint, wintergreen, pineapple or licorice. The "dough" is then kneeded, rolled and cut into pieces, all by machinery. After drying, the sticks are wrapped, packed and shipped.

About 14,000,000 pounds of chicle, valued at over $52,000,000, are imported annually into the United States alone. The American republic is the largest user of chewing gum; Canada is reported second; in England the sale is beginning to be important.

GUM ARABIC, *air'a bik,* a brittle species of gum obtained from small thorny varieties of acacia trees that grow in Mexico, Arabia and India. In drying, the exuded sap of these trees forms globules, or tears, of a brown or yellow color. The gum is odorless and tasteless and easily dissolves in water. The finer varieties are utilized in medicine, the manufacture of confectionery and in the making of mucilage. It is also used to add luster and stiffening to silk. When employed for labels and envelope flaps it is mixed with glycerine and sugar, in order to prevent its becoming stiff enough to crack and fall from the paper. See MUCILAGE.

GUM'BO, the name applied to a soup for the table. It originated in Louisiana, and has long been exceedingly popular throughout the South; now its use has become nearly universal. It is made with a foundation of chicken stock, and is thickened with gumbo, or okra, the unripe pods of a plant of the hibiscus family. This vegetable abounds in mucilage; it is a native of the West Indies, but will grow in any tropical or subtropical climate. See OKRA.

GUM RESINS, *rez'inz,* vegetable substances obtained from plants, containing resin, which dissolves in alcohol, and gum, which is soluble in water. They also include an essential oil, some coloring matter and a number of impurities. They are solid, opaque and brittle, and are usually characterized by a strong and distinctive taste and odor. They do not flow naturally from plants, but are chiefly extracted by means of incision, or cutting. The principal gum resins include asafetida, aloes, myrrh and ammoniac.

GUN. See CANNON; RIFLE; SMALL ARMS, and other articles referred to under those titles.

GUNBOAT, a small type of war vessel specially built for service in rivers and coast waters for coast defense and patrol duties. The first vessel of this class was built for the British navy in 1867; it carried only one gun, but the armament has been greatly increased in later patterns. The modern gunboats of the United States navy would be more properly classed as cruisers, as they carry heavy armament and are ocean-going vessels. Many wooden gunboats carrying only one gun were built for use in the War of 1812, but proved disappointing. Gunboats are now extensively used by the British on the Nile, the Zambezi and other rivers, and for service on the Chinese coast, but the one-gun vessel has been entirely superseded. The latest type, now used in all navies since about 1900, is built of steel, fully armored, and carries two four-inch, quick-firing guns, four twelve-pounders, and as many as ten machine guns. While effective as auxiliaries and patrols, gunboats are not sufficiently fast or powerful to be formidable by themselves. See NAVY.

GUNCOTTON, a highly explosive substance discovered in 1845 by Schönbein, a German chemist. The best guncotton is made by soaking purified cotton in a mixture of sulphuric and nitric acids. For military purposes twelve pounds of the acid mixture are used for every pound of cotton, which is allowed to soak, or "digest," for twenty-four hours. Weak solutions of the acid are used to produce less powerful guncotton. Cotton waste and rags are used to produce the guncotton used in smokeless powders. The rags are shredded by machinery and chemically reduced to a pulp which is then treated in the same way as purified cotton. Guncotton is employed in the explosives in torpedoes, mines, shells and cartridges, and is also used for making celluloid, collodion and varnishes. In small quantities guncotton burns rapidly but does not explode unless confined. See EXPLOSIVES; SMOKELESS POWDER.

GUN'POWDER. Exactly who invented gunpowder, no one knows. Friar Roger Bacon of

Oxford wrote a book in the year 1242, in which he told how to make an explosive mixture containing saltpeter, and for this reason he is sometimes called the inventor of gunpowder, but he was probably recording what had been known centuries before his time. It is in fact regarded as almost certain that such mixtures were used by the Chinese before the Christian Era. Berthold Schwartz, a German monk of the fourteenth century, is also given the credit for the invention, but more especially for producing the first firearms known to Western countries. Nothing is known with certainty, however, except that cannons were in existence at least as early as 1326 in Florence, 1338 in France, 1340 in Germany and 1344 in England.

In all ancient writings gunpowder is described as being a compound of charcoal, sulphur and saltpeter. The early gunpowders were made by mixing dry materials, the result being that the incorporation of the different ingredients was imperfect and the action of the powder was uncertain. A great improvement was made when the materials were mixed in a moist state. The powder made by the wet mixture was used in pistols and guns about the year 1500. The composition of gunpowder varies considerably in different countries. In England, the United States and Canada the usual formula is saltpeter, seventy-five per cent; charcoal, fifteen per cent, and sulphur ten per cent, though there may be considerable local variations.

The ingredients are first mixed dry, then moistened and ground between stone rollers. The mixture is then subjected to pressure, the quality of the powder depending on the pressure exerted. High-power powders need high pressure; slow-burning powders are produced under low pressure. The pressed mass of powder is ground in granulating machines, the grains are polished in revolving wooden barrels and are then dried and packed ready for use.

Gunpowder has probably less effect on the peaceful arts than any other important invention or discovery. It entirely revolutionized the art of war and has resulted in the expenditure of millions and millions of dollars annually on arms and ammunition and the loss of many millions of lives. Its beneficial effects on civilization have perhaps been widespread though indirect. The force of gunpowder caused the flags of civilization to wave over savage countries, and under the protection of the same forces peaceful arts have been developed. From the field of engineering it has been driven by more powerful explosives, except in operations such as removing stumps. In warfare it has been superseded by smokeless explosives and nitro compounds as a propelling force, and in high explosive shells, hand grenades and their like, but is still made the bursting charge for shrapnel shell and the priming for fixed ammunition. In sports smokeless powders are almost wholly employed. L.R.G.

Consult Heine's *Gunpowder and Ammunition;* Munroe's *Chemistry and Explosives.*

Related Subjects. The reader is referred to the following articles in these volumes:

Ammunition	Dynamite
Blasting	Smokeless Powder

GUNPOWDER PLOT, in English history, a conspiracy to blow up the Houses of Parliament with gunpowder, on November 5, 1605, when King James I was to preside at the ceremonies attending the opening of the sessions. The plot originated with a group headed by Robert Catesby, Guy Fawkes and others, who resented the hostile attitude of the government toward Roman Catholicism. One of the conspirators, wishing to save a friend from the general destruction, wrote him a letter warning him not to be present at the opening of Parliament. This led to the discovery of the plot and to the arrest and execution of most of those concerned in it. The conspirators, instead of remedying the condition of the Roman Catholics in England, only increased their oppression. For many years an annual festival was held on November 5, when it was the practice to burn Guy Fawkes in effigy.

GUNSAULUS, *gun saw' lus,* FRANK WAKELEY (1856-), an American clergyman, author and educator, born at Chesterville, Ohio. He was graduated from Ohio Wesleyan University in 1875, was ordained in the Methodist ministry, where he preached for four years, and in 1879 entered the Congregational ministry. He served as pastor of churches in Columbus, Ohio, Newtonville, Mass., and in Memorial Church, Baltimore, Md., then, in 1885, became pastor of Plymouth Church, Chicago. In 1899 he accepted a call to the Central Church, an independent organization, in the same city. When the Armour Institute of Technology was founded by Philip D. Armour in Chicago in 1893, Dr. Gunsaulus became its first president, upon the earnest solicitation of Mr. Armour, and is still the head of that institution. His lectures on John Hampden and Savonarola, and other subjects of a more popular nature, have added to his wide popularity. Among his published works are *Monk and Knight, Trans-*

figuration of Christ, The Minister and the Spiritual Life and *Loose Leaves of Song*. See ARMOUR INSTITUTE OF TECHNOLOGY.

GUR'NARD, SEA ROBIN or **GRUNT'ER,** names applied to a number of marine spiny fishes, of which there are probably forty recognized species. When taken out of the water they emit a faint, grunting sound, hence their name. The head is angular and entirely covered with bony plates; the body is long, nearly round, and tapering. The lower three rays of the large side fins are semidetached, and are used in seeking food as well as to assist movement through the water. Many species are remarkable for their beauty of color. In the United States and Canada these fish are known as sea robins, the most common species being found on the east coast from Nova Scotia to South Carolina. The flying gurnard is found on both coasts of the Atlantic. The flesh of the European gray grunter is highly esteemed, but that of the American variety is little used for food.

GUS'TAF V (1858-), king of Sweden, who came to the throne in December, 1907, at the death of his father, Oscar II. He was born in the castle at Drottningholm, entered the army at the age of seventeen, and studied at the University of Upsala. During the years 1878 and 1879 he spent his time traveling in most of the countries of Europe. In 1881 he married Victoria, the daughter of the Grand Duke of Baden, and they have five sons. From 1884 to 1891 he served as regent of Norway, during the illness of his father, and in 1892 became lieutenant-general. Several times, during his father's absence or illness, he acted as regent, so that he was well prepared to take up the royal duties when he was called to the throne. In 1914 King Gustaf made a patriotic speech at a mass meeting of 40,000 peasants in which he advocated increased armament, thus arousing criticism among the Liberals and Socialists, who opposed his militaristic policy. In the War of the Nations he sympathized with Germany.

KING GUSTAF V

GUSTA'VUS, the name borne by four kings of Sweden, of whom the second, known as Gustavus Adolphus, was particularly notable.

Gustavus I (1496-1560), founder of the royal House of Vasa, and king of Sweden from 1523 to 1560, is commonly known as GUSTAVUS VASA, the name *Vasa* being derived from a device on his coat of arms which resembled a vase. He was the son of Erik Johansson, a Swedish nobleman. At the age of eighteen Gustavus adopted the cause of the Swedes who were fighting for independence from Danish rule, and four years later he was treacherously carried off by the king of Denmark, with five other Swedish hostages, and held a prisoner for over a year.

Eventually he made his escape; taking refuge in the Swedish province of Dalecarlia he roused the peasants of that district to resist the oppression of the Danes. At the head of the Swedish forces he won many victories, and after the capture of Upsala was proclaimed administrator of the Swedish kingdom. Two years later, in 1523, the Swedish Diet declared the union of Sweden and Denmark dissolved and proclaimed Gustavus king. During his reign of forty years Protestantism was established as the state religion, and the material prosperity of the country was greatly advanced. When he died Sweden possessed a well-supplied treasury, a standing army of 15,000 men and a good fleet.

Gustavus II, better known as GUSTAVUS ADOLPHUS (1594-1632), was the celebrated general who turned the tide for the Protestants in the Thirty Years' War (which see). He was the grandson of Gustavus I, and succeeded his father, Charles IX, in 1611, at a time when the country was involved in wars with Denmark, Russia and Poland. In bringing these wars to a conclusion he won large tracts of territory for Sweden, made his armies the most efficient in Europe, and won for himself the title "Lion of the North."

Peace was declared in 1629, and the next year, at the head of an army of 13,000, Gustavus invaded Germany, where the Protestants were facing defeat in the religious struggle known as the Thirty Years' War. In 1631 he defeated a Catholic army under Tilly at Breitenfeld, and the following year overwhelmed the forces of Wallenstein (which see) at Lutzen. In this great battle he himself was mortally wounded, but he had saved the cause of Protestantism in Germany. A noble monument now marks the spot where he died. During the brief periods when Sweden was at peace, Gustavus Adolphus devoted himself to the

development of his country's commerce and manufactures, and it was due to him that the Scandinavian kingdom attained a supreme position among the nations of the North.

Gustavus III (1746-1792) ascended the throne in 1771, at a time when the country was harassed by the rivalry of political parties and by the misrule of the nobles. The sovereign at this period was merely a figurehead. Gustavus recovered the powers his predecessors had lost by forcing the Diet to accept a new constitution, but his reign was not distinguished in other respects. A war with Russia, begun in 1788, resulted in nothing to his advantage. Four years later he was shot at a masked ball through a conspiracy of the nobles, who were jealous of the powers which he had gained. Gustavus III was a dramatist and poet of considerable ability.

Gustavus IV (1778-1837), also known as GUSTAVUS ADOLPHUS, was the son of Gustavus III, whom he succeeded in 1792. He began his personal rule upon reaching legal age in 1800. His reign was a series of follies, the outcome of his blind hatred of Napoleon. In 1807 the French wrested from the Swedes their last possessions in Germany, and in 1808 the king involved Sweden in a disastrous war with Russia, which was then an ally of France. This came about through the opening of his ports to English vessels, which Napoleon was trying to prevent (see CONTINENTAL SYSTEM). As a result, Finland was lost to Sweden, and the exasperated Swedish nobles rose in revolt. In May, 1809, Gustavus was formally deposed by the Diet, and the Duke of Sudermania was chosen king as Charles XIII. B.M.W.

GUTENBERG, *goo' ten berK,* JOHANNES (1400-1468), the inventor of the art of printing with movable type. By his device the letters were separated, and movable blocks were used for the first time; previously all printing had been done with solid blocks upon which words were engraved. The inventor's name originally was JOHANN HENNE GENSFLEISCH, but he took his mother's name so that it should not become extinct.

JOHANNES GUTENBERG

It is said that the contemplation of a wine press gave Gutenberg his first notion of a machine for printing. To bring his invention to a successful point Gutenberg was obliged to borrow money from Johann Faust, or Fust, a goldsmith and money lender. After five years Faust sued for the money which he had advanced for carrying on the business and got possession of the printing outfit. He and his son-in-law, Peter Schöffer, claimed credit for the invention, but Johann Schöffer, son of the latter, states in the preface of a volume published in 1505 that "the admirable art of printing was invented in Mainz in 1450 by the ingenious Johann Gutenberg, and was subsequently improved and handed down to posterity by the capital and labor of Johann Faust and Peter Schöffer."

Gutenberg was born in Mainz in 1400 of a noble family, but left his native city in 1420 on account of political controversies. He was employed on mechanical works in Strassburg until 1448, when he returned to Mainz, and two years later formed the hapless partnership with Johann Faust. The earliest book issued from the press was the 42-line Bible, commonly known as the *Mazarin.* He also printed several other religious books.

In 1465 Gutenberg was honored by the Archbishop Adolphus by a mark of distinction to which his genius and labor entitled him. He was admitted among the nobility of the Court of the Archbishop and was given a pension. Statues have been erected in his honor, prominent among which is one erected in 1837 in Mainz by Thorwaldsen.

Consult Hessel's *Gutenberg: Was He the Inventor of Printing?*

GUTHRIE, *guth'ri,* OKLA., the county seat of Logan County and until 1911 the state capital. It is thirty miles north of the present capital, Oklahoma City, is north of the center of the state, and on the Cimarron River and Cottonwood Creek. The Atchison, Topeka & Santa Fe, the Chicago, Rock Island & Pacific, the Missouri, Kansas & Texas, the Saint Louis, El Reno & Western, the Oklahoma Eastern and the Fort Smith & Western lines provide railroad accommodations. The population in 1910 was 11,654; in 1916 it was 12,035, by Federal estimate.

Near the artesian mineral waters of Guthrie a fine $100,000 municipal bath house has been erected. The waters are medicinal, and their curative properties are attracting many people to the city. Guthrie contains a private sani-

tarium for the treatment of mental disorders, the Methodist Hospital, Guthrie Hospital, Oklahoma Methodist University, Saint Joseph's Academy and the state school for the deaf and dumb. Among a number of fine public buildings are the Federal building, erected in 1904 at a cost of $100,000 and remodeled in 1914 at an additional cost of $150,000; a city hall, courthouse, convention hall, Masonic Temple and a Carnegie Library. There are five city parks, each containing over 100 acres.

Stock raising, poultry raising and agriculture are the principal industries of Logan County, for which Guthrie is the market and manufacturing center. Alfalfa, Indian corn, wheat, cotton, fruits, Spanish peanuts and field peas are the important crops. In prosperous seasons Guthrie ships over 1,000 cars of Elberta peaches to Northern and Eastern markets.

Fuel from the coal, oil and gas fields in the vicinity is used by many manufacturing plants. These include cottonseed oil mills, a cotton-spinning mill, flour mills, a creamery, large printing plants, sash and door factories, a rug and broom factory and an iron foundry.

Guthrie was founded when the territory was opened for settlement in 1889. It was made the capital the following year, and was temporarily the capital of the state after Oklahoma and Indian Territory were united (see OKLAHOMA, subhead, *History*). The commission form of government was adopted in 1911. The water works are owned and operated by the city. F.L.W.

GUT'TA-PER'CHA, a name derived from the Malay language, *gutta* being Malay for *gum,* and *percha,* the name of the tree. It is the milky juice from various trees of the sapodilla family that grow in the East Indies. In appearance it is hard and is similar to rubber, having great insulating power, and is very flexible. To gather the juice the bark is first stripped from the trees, and the thick white sap is allowed to run into troughs. A thick cream rises after the sap is exposed to air, and the liquid becomes darker. This cream is removed and made into cakes; after being dried it is put in a machine called a *masticator,* which is made to revolve until the mass become hard and capable of being kneaded. It is then cut into blocks weighing from five to ten pounds and is ready for shipment.

Gutta-percha is employed for insulation of electrical wires, and in chemical works it is valuable on account of its resistance to acids. Golf balls and artificial teeth mountings are also made from this product. India rubber and gutta-percha are often confused on account of the similarity of their uses; the chief difference is that the latter, while extensible, like rubber, does not regain its shape. See RUBBER AND RUBBER MANUFACTURE.

GUTTA-PERCHA
Branch of tree, with leaves, flowers and buds.

HOW TREES ARE TAPPED
The method is like that employed in the tapping of rubber trees.

GUTZKOW, *goots'ko,* KARL FERDINAND (1811-1878), a German dramatist and novelist, who exerted a powerful influence on the opinions of modern Germany through his literary works. He was born in Berlin, and after studying theology took up politics and became the leader of a small group of reformers called "Young Germany." Gutzkow's first novel, *Wally, the Skeptic,* appeared in 1835. It is directed against the common belief in revelation on the institution of marriage. He was condemned to three months' imprisonment for writing the book, and the German federal Diet decreed that all he had written or might yet write should be suppressed. On obtaining his freedom he went to the free city of Hamburg, where he brought out his tragedy *Richard Savage,* which was played at all the German theaters. His novels include *The Knights of the Soul* and *The Magician of Rome;* among his dramas are *Uriel Acosta, Queue and Sword* and *The King's Lieutenant.* He took up his residence near Heidelberg in 1873, and later removed to Frankfort-on-Main.

GUYOT, *ge'yo,* ARNOLD (1807-1884), a Swiss-American of high rank as a geographer and geologist, was born near Neuchatel, Switzerland, and educated at the College of Neuchatel and the University of Berlin. He took part with Agassiz in his Alpine investigations, and later became professor of history and physical geography in the Academy of Neuchatel. He settled in Cambridge, Mass., in 1848, and gave a series of lectures in New England, which he afterwards published under the title *Earth and Man.* He did much valuable work for the Smithsonian Institute in connection with meteorological science, which in 1855 earned him appointment as professor of geology and physical geography at Princeton, where he remained until his death. He was the author of widely-used textbooks on geography and of a series of wall maps.

GYMNASIUM, *jim na'zi um,* a word from a Greek term meaning *naked,* was applied in ancient Greece to public places set aside for athletic sports. It was the custom for the boys and young men of those times to wear no clothing when taking part in their games and contests, in order that their bodies might be perfectly free.

From this old use of the word is derived its modern meaning—a room or a building devoted to instruction and practice in physical training and usually provided with special apparatus. The apparatus used generally includes horizontal bars, parallel bars, flying rings, vaulting horses, poles and ladders—both swinging and stationary—trapezes, mattresses, Indian clubs and dumb-bells, elastic exercisers, striking bag, rowing machines, etc.; also the simple devices needed for playing basket ball, indoor baseball and similar games of action. Wonderfully good results, however, can be secured through right use of a gymnasium even without elaborate or expensive equipment. The important thing is the exercise itself.

It is a matter of note that educators are giving more and more attention to bodily development as an essential part of education. There is a growing tendency to establish gymnasiums in connection with public schools, often with trained teachers in charge. The cities are also beginning to lay out open areas, particularly in the poorer districts, and equip them as outdoor gymnasiums for the use of neighborhood children, providing such simple apparatus as swings, slides, rings, seesaws, trapezes, bars and the like.

Among the best-known gymnasiums of the United States are those connected with the universities of Syracuse, California, Princeton, Yale, Harvard and Dartmouth. The Patten gymnasium of Northwestern University, Evanston, Illinois, is probably the most completely equipped university gymnasium in the world, having been built in 1913 at a cost of $306,000. Various private gymnasiums are conducted by societies and individuals, where one may secure instruction and practice on payment of certain fees. For structures designed for outdoor exercises, participated in by students collectively, see STADIUM.

What It Means in Germany. In Germany the word *gymnasium* has a totally different meaning; there it is applied to the class of schools corresponding to the college-preparatory schools of the United States and Canada. In them the higher branches of literature and science are taught, and students must pass a severe examination before being admitted to the university. The German gymnasium is therefore a school for *mental exercise,* while the American gymnasium is a school for *physical exercise.* W.C.

GYMNASTICS, *jim nas'tiks,* formal exercises for strengthening the different parts of the body and promoting health. Such exercises include club swinging, to develop the muscles of the arms, wrists, back and shoulders; bending exercises, for the benefit of the waist, hip and abdominal muscles; running exercises

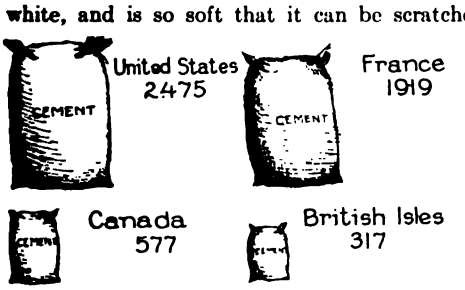
and the like. Gymnastic exercises are one phase of the general and harmonious training of the physical organism which may be summarized in the general term *physical culture*. Some authorities use as a synonymous term *physical education*. For a detailed discussion of gymnastic exercises, with appropriate illustrations, see the article PHYSICAL CULTURE.

GYMNOSPERMS, *jim'no spermz,* plants which have naked or exposed seeds. All other seed-bearing plants are *angiosperms* (which see). The name *gymnosperm* is taken from two Greek words meaning *naked* and *seed*. All gymnosperms are trees or shrubs, and there are over four hundred living species. Most of them are evergreens and cone-bearing trees, such as pines and firs, so to this class belong some of the most valuable timber, tar, rosin and turpentine producing trees of the world. Pollination of gymnosperms is taken care of by the wind, so they do not advertise to insects with brightly hued blossoms. The flowers, or cones, are of one sex, either male or female. Cycads and the ginkgo are also gymnosperms.

Related Subjects. The reader is referred to the following articles in these volumes:

Cone-Bearing Trees	Ginkgo
Cycads	Pollen and Pollination
Evergreen	

GYPSUM, the mineral from which plaster of Paris and alabaster are obtained (see PLASTER OF PARIS; ALABASTER). It is a compound of lime and sulphuric acid. Gypsum is found in large beds which are supposed to have been formed by the evaporation of water containing it in solution. It is usually white or yellowish-white, and is so soft that it can be scratched



AVERAGE YEAR'S OUTPUT OF GYPSUM

Before the beginning of the War of the Nations France nearly equaled the production of the entire United States.

by the finger nail. Sometimes a crystallized variety known as *selenite* is found. The purest crystals are transparent; they are long and tapering, and usually are arranged in star-shaped groups.

When heated, gypsum is reduced to a fine, white powder known as plaster of Paris. This when mixed with water and exposed to the air hardens quickly and is valuable for making all sorts of casts. It is most extensively used, however, for making the "putty coat" employed in finishing plastered walls in buildings, and is sometimes employed as a cement. Ground gypsum is a valuable fertilizer on soils needing lime (see FERTILIZER). Most of the "hard" water from springs and wells contains gypsum in solution. When the water is boiled some of the gypsum collects on the sides and bottom of the vessel, forming a white crust. Gypsum is found in large quantities near Paris; in Nottinghamshire, England, and in Nova Scotia, Michigan, Ohio, Iowa, New York and Virginia.

GYPSY, *jip'si,* a name given to a group of roaming people who are found in almost every country and who differ to a greater or less

TYPES OF GYPSY WOMEN

A characteristic of both sexes is a desire for cheap jewelry and gaudy trinkets. Many of the men wear rings in the ears.

degree in appearance, speech and habits from all other peoples. The origin of the *Romani,* as they call themselves, is unknown, but they are generally supposed to be the descendants of some obscure Hindu tribe. They were found in England for the first time about the beginning of the sixteenth century. In appearance the full-blooded gypsy, though rather undersized, is often very attractive, with regular features, olive skin, very black hair, dark and expressive eyes and extremely white teeth. These physical characteristics are as marked as are those of the Jewish people. Both men and women lose their good looks early.

As a race the gypsies are long-lived; it is not unusual to see among them men and women of very advanced age who are still robust and vigorous. Their religious system, if one exists, is very vague, but traces of various forms of paganism are to be found in some of their customs and superstitions. In fancy they people every wood and stream with spirits whose influence must be sought and whose wrath must be appeased by various rites and charms. The gypsies pursue different wandering occupations, such as basket-making, blacksmithing, tinkering, etc. Horse-trading is one of the favorite activities of the men, and almost the only one in England and America. The women tell "fortunes." In Russia, Poland, and especially in Hungary, they are noted musicians, their melodies often figuring in popular light operas, as in *The Bohemian Girl,* whose "Gypsy Chorus" is remarkably tuneful. There are probably 700,000 gypsies in Europe; Asia has countless numbers of them, and they are continually emigrating to the United States and Australia. Modern gypsies are without the romance credited to them by tradition and fiction; and in carelessness of attire and general lack of grooming, they rank with the vagrant classes, and are usually regarded with disfavor.

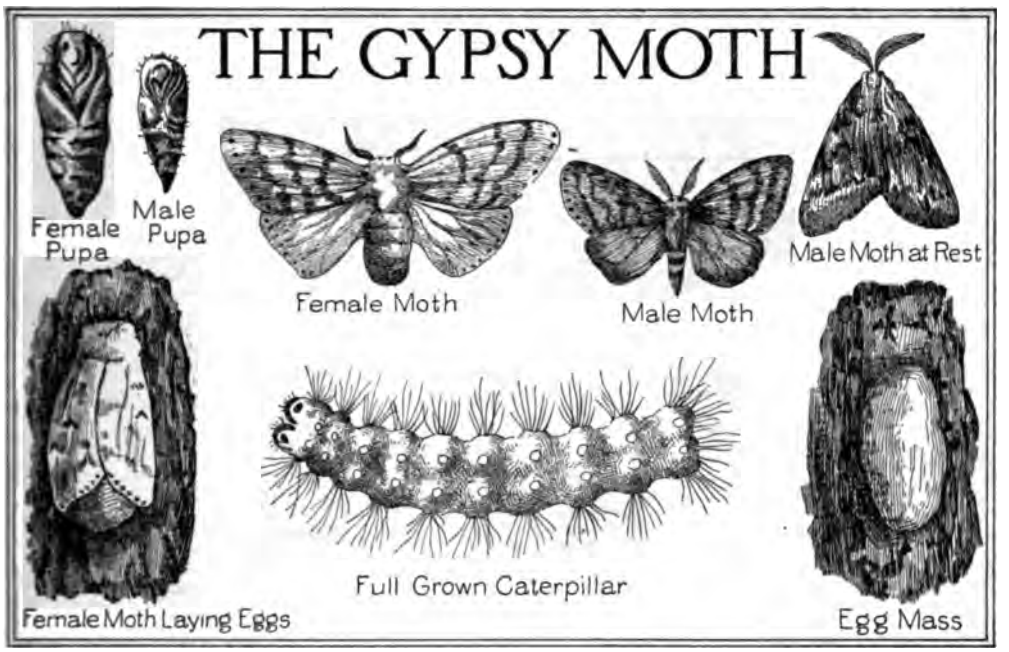
GYPSY MOTH. In its caterpillar stage the gypsy moth is a destructive and dreaded pest. It gets into oak, willow, elm and apple trees especially, and eats them bare of foliage as if a fire had swept over them. When those trees are stripped, the greedy caterpillars attack other fruit and shade trees, vines, shrubs and garden and field crops. Even pines are sometimes attacked, and the trees die when all the leaves are eaten.

Just how or when insect pests reach certain localities is not always known, but the history of the gypsy moth in America is known from its beginning. For centuries it had been destructive to fruit and shade trees in Central Europe. Not until 1869, however, was it introduced into America. A French scientist was experimenting in Medford, Massachusetts, with various American and European silkworms, trying to find one which would be free from disease. Among his specimens were gypsy moths. One day some of his specimens accidentally escaped. He called the attention of the public to the fact, but the matter was forgotten until twenty years later, when the ravages of the caterpillar became so severe in Medford that the state was called to the aid of property owners. Then for ten years the work of exterminating the moth was carefully carried on, at an expense of about $1,000,000. The work was then abandoned, as the insect had become so scarce further appropriations for the task seemed to be unnecessary.

Since then, however, the moth has again gradually multiplied and different sections of the country have been obliged to take up the work of destroying it. Half-grown caterpillars, hanging from branches of trees, drop upon passing animals and conveyances, and in that way are carried to places not previously infested. Gypsy moth colonies have been found in Rhode Island and one as far west as the vicinity of Cleveland, Ohio. In 1914 an appropriation of $310,000 was made by the United States for gypsy moth and brown-tail moth investigation. Recent reports on the gypsy moth are to the effect that it is less hardy and more susceptible to disease than when it first appeared in Massachusetts, and that it seems to be changing its food plant. Inspectors examine all lumber products sent from Eastern New England, most of that country being quarantined against the gypsy and brown-tail moths.

The name *gypsy moth* is probably due to the gypsylike, olive-brown color of the male moth. He is a slender creature, with wings blackmarked. His wing-spread is about one and a half inches. The feelers (antennae) are beautifully featherlike. The female gypsy moth is heavier and lighter colored than the male; she is white or buff colored, and her markings are less distinct. Although her wings are well developed and have a spread of about two inches, she never flies. The male flies late in the afternoon and early in the evening in a peculiar zigzag path.

In July and August, yellowish, hair-covered masses of eggs are laid on tree trunks, rocks and fences. The clusters vary in size and contain from 75 to 1,000 eggs, about one-twentieth of an inch in diameter. Hardy and unharmed by wind or weather, these eggs develop through the winter, and from the last of April until the middle of June hatch into little, black-headed, hairy caterpillars with bodies brownish-yellow. The young stay on the egg clusters from one to five days, then start to feed on leaf hairs. Very soon they eat holes in the leaves. They shed their coverings three or four times. During the day the caterpillars usually hide, but at night they feast on the foliage of fruit and shade trees.



A full-grown caterpillar is about two or two and a half inches long, with a double row of warts on its back. Eight at the end of the body are blue, twelve are red; and four blue ones are behind the head. Similar warts occur on the sides. In midsummer the caterpillars go to sheltered places and spin about themselves loose cocoons. In this silky shelter they pupate and in two weeks the moths come forth.

The most effective way to fight this pest is by careful collection and burning of egg-masses. This can be done between August and May. A fire run over the ground will not always kill the eggs, however. Burning them in a stove is the surest way. The eggs can also be killed by applying the following mixture to the masses: Creosote oil, 50 per cent; carbolic acid, 20 per cent; spirits of turpentine, 20 per cent, and 10 per cent of coal tar to color the mixture to show which clusters have been treated.

Large numbers of caterpillars can be caught by banding infested trees with burlap or other coarse cloth. The caterpillars hide during the day and many will choose the fold of the band as shelter; they can then be removed and killed. Spraying trees with arsenate of lead, using ten pounds to one hundred gallons of water, will destroy them, if the work is done in May and June while the creatures are still young. M.S.

The United States Department of Agriculture has issued a *Bulletin* (No. 11) on the extermination of the gypsy moth, which may be had on request.

Related Subjects. The reader is referred to the following articles in these volumes:

Brown-tail Moth
Caterpillar
Cocoon
Insecticides and Fungicides
Insects
Moth

GYROSCOPE, *ji'ro skope,* a mechanical apparatus that demonstrates the principles of rotation and equilibrium of bodies in motion, the center of gravity and centrifugal force. In form a gyroscope consists of a circular disk with a heavy rim. It is mounted upon an axis in a way in which it can revolve with the least possible resistance. In turn, this axis is also mounted in a direction at right angles to that of the disk.

Fig. 1 illustrates the gyroscope in its simplest form. The wheel is heavy and firmly secured to its shaft. The outer ring is equipped with bearings carrying the shaft and allowing it to turn freely. This arrangement of simple parts exhibits none of the characteristic features of the gyroscope until the wheel is made to rotate. The toy machine must be rotated by an unwinding string, as shown in the illustration. Then some of the seemingly impossible things of which the machine is capable become apparent. So long as the wheel is kept in rapid motion the gyroscope resists any change

in the wheel's plane of rotation with a force many times greater than the weight of the whole apparatus. This resistance to change increases with an increase in the speed of rotation. The "plane of rotation" in this case

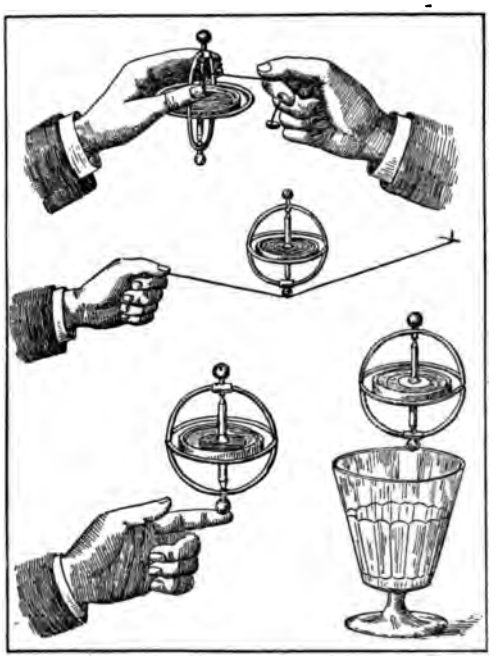


FIG. 1
The toy gyroscope, clearly illustrating the principles of the instrument.

is an imaginary surface at right angles to the shaft and passing through the center of the wheel. This resistance to changing its plane of rotation is the essential characteristic of the gyroscope.

The gyroscope was discovered in 1832, but until recent years was little more than a scientific curiosity. It has now come into considerable use; the most important of its practical applications are the following:

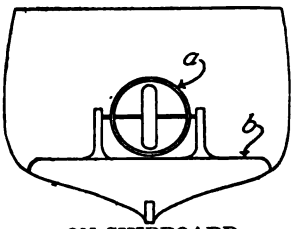
As a stabilizer for ships to reduce rolling in a rough sea;

As a stabilizer for automatically balancing aeroplanes;

As a balancing device for monorail cars, and, in a developing field, for two-wheeled automobiles, the wheels being arranged as in a bicycle.

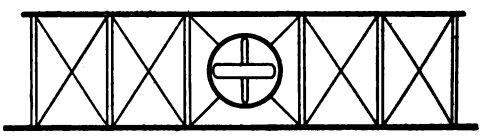
The Gyroscope as a Toy. Gyroscopes in several sizes can generally be bought in toy shops. Usually an instruction book is given to each purchaser, telling how to make the gyroscope "walk a tight-rope," balance itself on the edge of a tumbler, spin at the end of a string and do many other interesting things.

Ship Stabilizer. The gyroscope has been successfully used to reduce to slight degree the rolling of ships at sea. Fig. 2 shows the general arrangement and location of the gyroscope when used for this purpose. The supporting frame is firmly secured to the ship's hull and the wheel is rotated by an electric motor, as in all gyroscopes for practical use. The weight of a gyroscope for this purpose should be about $\frac{1}{100}$ of the ship's displacement.



ON SHIPBOARD
(Fig. 2.)
(*a*) Gyroscope; (*b*) lower deck.

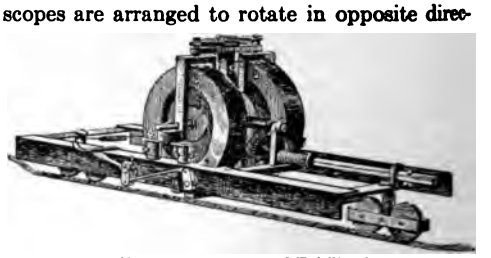
Aeroplane Stabilizer. Gyroscopes used for this purpose are mounted as shown in Fig. 3, and operate in two ways. One method is to use the resisting power of the gyroscope to overcome any tendency toward tipping. The



ON AN AIRSHIP
(Fig. 3.)

other is to use a smaller and lighter wheel connected to a series of levers that move the small balancing vanes at the ends of the wings.

Balancer for Cars and Automobiles. Pairs of gyroscopes mounted, as in Fig. 4, and rotated in opposite directions have been successfully used to balance railroad cars designed to run on one rail instead of two. The pair of gyroscopes are arranged to rotate in opposite direc-



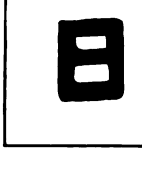
MODEL FOR MONORAIL CAR
(Fig. 4.)

tions and are needed to enable the car to turn a sharp corner. Under such circumstances a single gyroscope mounted horizontally would tip the car to the inside of the turn. With two, rotating in opposite directions, this tipping tendency is overcome and the car is kept level when turning a corner. A.R.

THE WORLD BOOK
ORGANIZED KNOWLEDGE IN STORY AND PICTURE

Hh

H, the eighth letter in the English alphabet, the so-called *aspirate,* or *breathing,* letter. In the Phoenician, from which, like practically all the English letters, it was derived, its name meant *look!* or *see!* and naturally the object chosen to represent it was that through which one looks—a window. When the Greeks took over this letter they gave it a new value, making it represent a vowel sound, and the English *H* is thus more closely related to the original Phoenician than to the intermediate Greek.



H has but one value in English, though in some words it is emphasized more than in others. In *bush,* for instance, it is more distinctly sounded than in *history,* while in some words, as *honor,* it is silent. Very frequently it is joined with other consonants to form digraphs, which represent sounds that no single letter stands for. Thus *th, sh* and *ch* are really necessary combinations. In other instances, however, the digraph represents a sound which is as well indicated by some single letter. *Rheumatism* could be pronounced as well without the *h,* while *trough, dough, trophy* and *laugh* might be more simply spelled. In fact, *h* is one of the letters over which the advocates of simplified spelling have been most concerned; they think it should be eliminated from many words.

HAAKON, *haw'kohn,* **VII** (1872-), king of Norway, assumed the crown upon the invitation of the Storthing in 1905, after the separation of Norway from Sweden. He was Prince Karl, the second son of Frederick VIII of Denmark. After attending the Danish Naval Academy, he served as an officer in the navy for a time. His love for and knowledge of the sea have made him very popular among the people of his adopted nation, who are descendants of the old Vikings. In 1896 he married Princess Maud, the youngest daughter of Edward VII of England, and they have one son, the young Prince Olaf, born in 1903. The Norwegian people highly approved the choice of the Storthing in its selection of their king, and he was crowned in the historic cathedral at Trondhjem.

HAAKON VII
Brother-in-law of King George V of England.

When Haakon VII came to the throne he adopted the name which was borne by six Norwegian kings in the Middle Ages. Their reigns are of little importance, except that of Haakon IV, who is remembered because he added Greenland and Iceland to his realm.

HAARLEM, *hahr'lem,* the clean and well-built capital of the Dutch province of North Holland, situated in very picturesque surroundings eleven miles west of Amsterdam. Intersected by canals and containing quaint, interesting houses, it is one of the most attractive cities of the nation. In the principal church, known as Saint Bavo's Kerk, is an organ built in 1735 which is one of the largest of its kind in the world, while in front of the church is a statue of Coster, for whom is claimed the invention of printing; he was born in the city. The town hall, remodeled in 1620, a former palace of the counts of Holland, contains a collection of paintings by Dutch artists, including eight large canvases of Frans Hals.

One of its oldest and most extensive industries is the cultivation of flowering bulbs and tubers, mainly hyacinths and tulips, which are shipped to all parts of the world. Population, about 70,000.

HABAKKUK, *ha bak'uk,* or *hab'a kuk,* a short book of the Old Testament, named after its author, the eighth of the minor Hebrew prophets and one of the tribe of Levi. Although not dated, the book was evidently a production of the Chaldean period, about 600 B. C., during the early part of Jehoiakim's reign. In the book, which is a poem as well as a prophecy, Habakkuk complains to God because he fears that the innocent will suffer as well as the guilty, but God tells him that the just shall be saved by faith. The destruction of the Babylonian Empire is foretold, and the latter part is a beautiful song of prayer and praise expressing the quiet confidence of faith in God and in His goodness.

HABEAS CORPUS, *ha'be as kor'pus,* WRIT OF, a term incorporated in the English language from the Latin and meaning, in substance, *you are commanded to have the body.* It compels the proper authority to produce a person in court at a time named. The writ of *habeas corpus* is called "the great writ of personal liberty," because it makes unjust imprisonment or wrongful detention almost impossible. The writ is issued by a court at the request of some friend of a person accused of crime and held prisoner, and commands his custodian to bring him before the court, where his claims may be heard and judged. To obtain a writ of *habeas corpus* it is only necessary to observe legal formalities in presenting the request to the court, for except in times of public danger the right of any person to secure this writ cannot be denied. The foundation of the present form of *habeas corpus* in all English-speaking nations was laid in England's Magna Charta (which see), and the American and Canadian writs are an adaptation of the English form.

The application of this writ is very liberal. Besides its usual uses, as named above, cases have been heard where it was invoked to solve domestic wrongs, as when a wife is held captive and maltreated by her husband, and where a child of divorced parents has been held by one parent longer than the time allowed by the court. Any person accused of crime and held too long without a hearing may have a writ of *habeas corpus* issued in his behalf and thus compel his accusers to appear in court to show sufficient cause for holding him longer in custody.

HAB'IT. "Sow an act," says an old proverb, "reap a habit; sow a habit, reap a character." Another popular saying declares that "Habit is second nature." These statements do not overemphasize the part played by habit in the life of the ordinary human being. A habit, by definition, is a *fixed tendency* to perform certain acts in a certain way—a tendency so strong that it is beyond the jurisdiction of the will and sometimes beyond that of consciousness.

How Habits Are Formed. Most habits, to be sure, originate in conscious acts, but every time the act is performed it becomes easier and simpler, until in time it ceases to need attention. When a baby is first given a spoon and allowed to feed himself, every act is a conscious one. He picks up the spoon, carefully turns it right side up, takes up the food with it, and guides it as accurately as may be to his mouth. But not a very long time elapses before the whole business of eating becomes habitual, and, in a manner, takes care of itself.

Listen to a child practicing her music lesson. With her eyes first on the printed page, then on the keyboard, she carefully picks out each note and as carefully chooses its counterpart on the piano. But hear the same child years later. Apparently the brain says to the fingers, "Play the Paderewski Minuet," and they play, quite without guidance from the brain; for the performer can carry on a conversation and not seriously interfere with her playing, for it has now become habitual.

How Accounted For. This is the psychological, or mind, phase of habit, but in the end it must work back to physiological, or bodily, processes. The general tendency of these scientists know, though they cannot describe just what really happens. Everyone has watched a little stream flowing down a hillside in its rather deep-cut channel. There must have been a time, long ago, when there was no stream bed—when the first drops of water found their way down the hill, flowing around a stone here, slipping through a sandy spot there, but always choosing the easiest path, the line of least resistance. Next time the snow melted on the hilltop and the water began to run down, that same path was just a little easier because it had been traveled before; and each time this became more and more noticeable. Finally, following the route of the first tiny trickle, there appeared the actual stream bed, deep-carved in the rock.

It is in some such way that habits are formed, though the making cannot be watched so clearly. An action is performed once and somewhere in the complex nervous system it leaves its tiny record. Next time the same action is performed the record becomes a little clearer and more definite, until finally the action, so to speak, performs itself whenever the proper stimulus is given. To be sure, no one has even seen these tracks which actions record on the nervous system, but they prove their existence positively.

Importance of Habits. Is habit, on the whole, a good or a bad thing? Suppose a man had to put his whole attention on every detail of everything undertaken; how much would he accomplish? The writer would be so occupied in seeing that his letters were correctly made that his brain could not concentrate upon original thoughts; the piano-player so busy glancing from music to keyboard and back again that the music produced would be a series of jerky sounds; the walker so interested in keeping his feet on the pathway that he would have no eyes for the beauties around him. As it is, the brain turns many of these simple functions over to the lower nervous centers and is thus free to occupy itself with worthier things. Conscious attention, long continued, is a very fatiguing thing, and the more acts that can be performed habitually or unconsciously, the smaller the mental demand.

For instance, if a man who has daily work to do has to rouse himself and force himself to rise every morning; if he has to drive himself to his work each day, consciously bringing his attention to bear on it, he is using up a great store of energy which might be expended in making his work more efficient. Indeed, nothing is a greater help to the worker in any field than the formation of habits which make the detail work as nearly automatic as possible.

As the right sort of habits may be most helpful, the wrong sort can certainly hinder. Most conspicuous of all—sometimes almost the only sort of habits to which the name is applied—are such habits as those which result from the craving for drugs or for alcohol; habits which originate in a bodily demand, and become in time so strong that the will cannot control them. But there are other habits which are little less harmful—nervous habits, which expend energy unnecessarily; habits of covetousness, or of bodily or mental sloth. Childhood and youth are the time of habit-forming—the old man is little more than a bundle of habits; and no one phase in the training of children is more important than that they shall be assisted in the forming of right habits. Ovid, a poet of ancient Rome, voiced a truth which never will change:

> Ill habits gather by unseen degrees
> As brooks make rivers, rivers run to seas.

HACKBERRY. See NETTLE TREE.

HACKENSACK, N. J., a residential town and the county seat of Bergen County, is situated in the northeastern part of the state, fourteen miles north of Jersey City, and on the Hackensack River. The population, which in 1910 was 14,050, was 16,945, by Federal estimate, in 1916. The area of the city is four square miles. Railroad accommodations are provided by the New York, Susquehanna & Western and the New York, Ontario & Western lines, and by two divisions of the Erie. The West Shore Railroad is reached at Bogola, near the city. Electric lines connect Hackensack with Paterson, Hoboken, Rutherford, Passaic and Newark, and there is electric and ferry communication with New York City.

The city is attractively situated on a slope of land rising about Hackensack meadows along the river. It contains the Johnson Public Library, Hackensack Hospital, an Old Ladies' Home, a Federal building erected in 1916 at a cost of $100,000, and a county courthouse and jail. Of special interest are two historic buildings of the eighteenth century, a mansion-house and a quaint old Dutch church.

The city has manufactures of wall paper and silk and an important bookbindery. Textile dyeing, bleaching, brick manufacturing and the making of theatrical costumes and paper boxes are other important industries.

Hackensack, which was named for the Hackensack Indians, was settled by the Dutch about 1640. It was incorporated in 1868.

HACKETT, *hak'et,* JAMES KETELTAS (1869-), an American actor and manager, who became a leading man in New York at the age of twenty-four, the youngest leading man in the stage history of that city. He was born on Wolfe Island, Ontario, the son of an American actor, and, after graduation from the College of the City of New York in 1891, studied at the New York Law School. In 1897 he married the actress, Mary Mannering, and later appeared with her in various successful plays, such as *The Walls of Jericho* in 1906. Under the management of Daniel Frohman, his greatest successes were in *The Prisoner of Zenda* in 1896, its sequel, *Rupert of*

ween Private Property and Public The Education of the American Citi-dom and Responsibility; Standards of orality; and *Some Influences in Mod-sophic Thought.* W.F.Z.

AN, *ha'dri an,* PUBLIUS AELIUS HA-76-138), an emperor of Rome. Early distinguished himself in the Dacian later filled several important public n 117 he served in the Parthian War i kinsman, Emperor Trajan, and on 's death was appointed his successor. it wise for political purposes to adopt l policy, Hadrian made terms with ians, surrendering to them the terri-nd the Euphrates; checked by gen-s the invasion of the Roxolani, and and humane methods won the good s subjects. In A.D. 119 he left Rome a tour of the Empire, spending two Athens, his favorite city, which he and improved. The chief disturbance le was the revolt of the Jews which ied in 135. Hadrian's reign was y wise legal and military reforms, by ic improvements and by a spirit of shown to the Christians.

's Tomb, a massive tower erected by in A.D. 130, and known in its remod-as the Castle of Saint Angelo. Orig-structure served the purpose of a It is 230 feet in diameter, on a base-ut 300 feet square. The ancient edi-w almost hidden by the fortifications ve been added to it from time to ie castle was held by the Popes from of Boniface IX, and in 1500 was con-ith the Vatican by an underground See ROME, for illustration.

's Villa, an impressive country place nd built by Hadrian, near Tivoli. It in area of several square miles, and ent sections were named after the visited by the emperor in his travels. of its theaters, temples, baths, etc., n a fair state of preservation; they choice examples of ancient art now n the museums of Rome. See ROME.

EL, *hek'el,* ERNST (1834-), a oölogist and author, the most promi-porter of the Darwinian theories in

He was born in Potsdam. For rs Haeckel has worked untiringly in nd has made important contributions ience. Since his first scientific work shed in 1862 he has written about forty books on science. He has discovered and named more than 3,000 species of a single class of microscopic animals. He has searched the ocean for his specimens, from Helgoland to the Canary Islands, and from Great Britain to Malaysia. His most famous work, the *Riddle of the Universe,* was published in 1899, and has had over a million readers. It has been translated into every language that has any literature, and has excited a great deal of controversy. Haeckel is a thoroughgoing advocate of evolution, for he believes that the higher faculties of man have been evolved from the mind of the brute, just as his physical organism is the result of development from lower animal forms. Accordingly, he has been led to deny the immortality of the soul and the existence of a personal God.

His first inclinations were toward botany; but later he studied medicine and zoölogy at Berlin, Wurzburg and Vienna, then turned his attention to natural science. In 1861 he became "privat-dozent" at Jena; the following year he was established in the chair of zoölogy at the Jena university, and on February 16, 1909, celebrated his seventy-fifth birthday by resigning his professional position, after dedicating a beautiful new building, the Museum of Evolution, as a gift to the university. It was built at his own expense and is the only institution of its kind in the world. Haeckel was an eminent teacher. Two of the leading zoölogists of Great Britain, Sir E. Ray Lankester and Professor Thomson, were his pupils.

Among his works are *Anthropology, The History of Creation, History of the Evolution of Man, Collected Popular Discourses on the Development Theory, Origin and Development of Animal Tissues* and *The General Morphology of Organisms.*

HAGENBECK, *hah'gen behk,* KARL (1844-1913), the most renowned animal collector and dealer in the world. He stocked nearly all the circus menageries and zoölogical gardens on the three continents and was a notable pioneer in the handling of wild animals. He employed sixty European hunters to assist him in collecting wild beasts.

Hagenbeck was born in Hamburg, Germany, where his father was a fishmonger, although he gave some attention to animal training. When Karl was twelve years of age his father asked him whether he intended to become a dealer in wild beasts or a fishmonger. The boy chose animal training, and before he was a year older took charge of his father's collection of animals.

When P. T. Barnum visited Hagenbeck's animal park at Stellingen, near Hamburg, he bought $15,000 worth of animals. In 1905 Hagenbeck sold 1,000 dromedaries, each animal provided with a suitable saddle, to the German government, for use in Africa. He collected the animals in less than three months after the order was received. The German government was so pleased with the handling of this remarkable order that it promptly ordered another thousand. Hagenbeck made his first visit to the United States and Canada in 1886. He exhibited more than a thousand animals at the World's Columbian Exposition at Chicago in 1893, including many rare wild species.

HA'GERSTOWN, MD., a commercial city of importance and the county seat of Washington County, is situated in the northwestern part of the state. Baltimore is eighty-seven miles southeast, Washington is seventy-one miles southeast and Harrisburg is seventy-four miles northeast. The city is a few miles east of the Potomac River and Antietam Creek. It is on the Western Maryland, the Philadelphia & Reading, the Cumberland Valley, the Norfolk & Western and the Baltimore & Ohio railroads, and it has an electric interurban line. The population, ninety per cent American, was 16,569 in 1910 and 25,679 in 1916, by Federal estimate.

Hagerstown is situated in the heart of the Cumberland Valley. Near by are Fort Frederick and the battlefields of Antietam and Gettysburg. The prominent buildings of the city are the Federal building, Washington County Free Library and a hospital. It was formerly the seat of Kee Mar College, a nonsectarian college for women. City Park contains fifty acres.

Owing to excellent shipping facilities, Hagerstown is an important trading and manufacturing center, and its large railway and machine shops employ 3,000 men. Flour, furniture, silk, skirts, hosiery, automobiles, bicycles, agricultural implements, fertilizer, sash, doors and blinds, carriages, spokes and wheels are manufactured.

Hagerstown, which was settled in 1640, was laid out by Captain Jonathan Hager in 1762, and was incorporated in 1791. The present city charter was granted in 1848.

HAGGAI, *hag'a eye,* a Jewish prophet of the Old Testament, in Jerusalem, about 520 B.C., after the Israelites had returned from their exile in Babylon. His prophecies, four in number, constitute the Biblical book of *Haggai,* in which the writer urged the people to proceed with the building of God's Temple. He predicted a greater glory for the new Temple than had belonged to the former one, and implied that Zerubbabel, the son of the governor of Judea, would become king of his nation.

HAGGARD, *hag'ard,* SIR HENRY RIDER (1856-), an English novelist whose works have a persistent popularity, not because of special literary merit but because they show a fertile imagination and are successful in creating and maintaining a weird atmosphere. The scenes of many of his best-known novels are laid in South Africa, and if the events he describes are unreal, and the setting almost equally so, the thrill is very real and endures after the memory of the actual plot is lost. *She, King Solomon's Mines, The Return of She, Allan Quartermain, Jess, Montezuma's Daughter* and *Lysbeth* are perhaps read as much as any of his works.

Haggard was born at Bradenham in Norfolk, studied at Ipswich, and in 1875 went to Natal, South Africa, as secretary to the governor, Sir Henry Bulwer. After his return to England he studied law, but finding fiction-writing both pleasant and profitable, he devoted himself to it for years. Later he studied and wrote on agricultural conditions in Great Britain, and in 1905 was commissioned to report on the Salvation Army settlements in California and Colorado, with a view to establishing like colonies in the Transvaal. In 1912 he was knighted by King George V.

HAGGART, *hag'art,* JOHN GRAHAM (1836-1913), a Canadian statesman, for forty years a member of the Dominion House of Commons. Haggart was born and educated in Perth, Ont., where he engaged in business as a miller. He was elected to the House of Commons in 1872, and served without a break until 1912, when he voluntarily retired. He became prominent among the Conservative leaders, was postmaster-general under Macdonald from 1888 to 1892, and was then Minister of Railways and Canals until 1896. The Sault Sainte Marie Canal was completed under his direction. In 1894 many of the leading Conservatives felt that he was the logical successor of Sir John Thompson as leader of his party, but he was passed over in favor of Sir Mackenzie Bowell.

HAGUE, *hayg,* THE, the seat of Dutch royalty and of the government of the Netherlands. It is the city in that land of windmills

tes where some of the most famous ional alliances and treaties have been l. From a mere hunting-lodge for the of Holland in the thirteenth century gue became in the eighteenth century ter of European diplomacy. By the h century the eyes of the world were y turned to this little spot on the map. the dream of peace-loving people that gue might become the neutral capital world—a place where representatives tions might meet to arbitrate questions national importance, and thereby pre- r and its bloody sacrifice of human life ture. As a monument to that dream, lt by Andrew Carnegie, a magnificent of Peace now stands in The Hague as rters for the International Court of ion.

Hague is the chief city in the province h Holland. It is thirty-three miles st of Amsterdam, fifteen miles north- Rotterdam, and about three miles from th Sea. The name is derived from the *Graavenhage,* meaning *the count's hedge.* handsome city as well as a fashionable l has been described by De Amicis in *da* as half Dutch, half French. Broad, streets are crossed by picturesque which are lined with shops and dwell- l shaded by rows of beautiful trees. out the city are numerous fine parks. the buildings of most interest are the gue town hall, the very modest royal the handsome government buildings, ice of justice, and the Saint James or Groote Kerk, a Gothic structure the fifteenth century, in whose tower me of thirty-eight bells. The royal ry contains a rich collection of Dutch ding a number of masterpieces by that Dutch painter and etcher, Rembrandt. royal library are more than 500,000 ; and it also contains a valuable col- f coins, medals and cameos. The na- onument, in the center of Willems a magnificent memorial to the restora- Dutch independence in 1813.

ically, the most interesting buildings of gue are the old gate-tower, the Ge- oort, formerly used as a political he Binnenhof, where the Dutch states- rneveldt, was executed, and where the re now meets, and the Huis Ten Bosch, e in the Wood, the suburban royal ere the first peace conference met.

There are good educational institutions in the city. Among them are a gymnasium, a drawing school, the Royal School of Music and an educational institute conducted by the Freemasons. The Hague is also the home of many learned societies.

Scheveningen, on the North Sea coast, is practically a suburb of The Hague and is the most frequented seaside resort in Holland. A fine road and five electric car lines lead to it from the city. The prosperity of The Hague depends chiefly on foreigners visiting that watering place and the city itself, and upon the court and nobility. Little trade is carried on, and the manufactures are not important. Gold and silver ware, porcelain, hats, furniture and carriages are the principal manufactures. The starting point of the railway system of Holland is in The Hague. In 1913 the population of the city was about 302,000, or one-fifth that of the city of Philadelphia. Two-thirds of the people are Protestants.

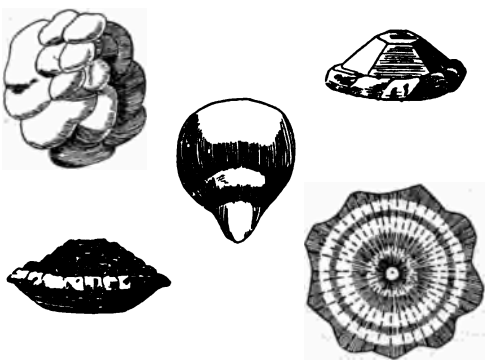
History. Originally the hunting center of Holland counts, The Hague became, in 1250, a residence for princes. From that it became the seat of the States-General in the sixteenth century, and then the capital of Holland. As the diplomatic capital of Europe it is noted as the place where the Triple Alliance of England, Sweden and The Netherlands against France was concluded in 1668, as was also the Triple Alliance of England, France and Holland in 1717 for the preservation of the Treaty of Utrecht. In 1899 the peace conference proposed by the Russian emperor assembled there, and The Hague was then chosen as the permanent place for international conferences. Another conference was held there in 1907 (see PEACE CONFERENCE, INTERNATIONAL, where there will be found an illustration of the Peace Palace). M.S.

HAGUE PEACE CONFERENCE. See PEACE CONFERENCE, INTERNATIONAL.

HAHNEMANN, *hahn'emahn,* SAMUEL CHRISTIAN (1755-1843), a German physician, founder of the homeopathic method of treatment of disease, established on the principle that "like cures like." He was born at Meissen, in Saxony, in 1775 went to Leipzig to study medicine, and paid his way chiefly by translating English medical works. He was graduated from Erlangen in 1779. After practicing medicine in various places, he translated Cullen's *Materia Medica* in 1789, and then adopted a new method of curing disease. In 1810 he published his work, to explain his system to the

world. In 1820 he was prohibited by the government from dispensing medicine, but Duke Ferdinand offered him a place at Kölhen, where he remained until 1833, then went to Paris, where a royal decree authorized him to practice homeopathy in 1835. His system has gradually extended until there are now about 15,000 homeopathic physicians in Canada and the United States. See HOMEOPATHY.

HAIL. Hailstorms usually occur during the hot summer months, and they frequently accompany severe thunderstorms. Hailstones are small balls or pellets of ice and snow which fall with the rain. They vary in size from tiny



FORMS OF HAILSTONES

particles, forming sleet, to balls two or three inches in diameter. Of the latter size, however, few are formed. They are usually about the size of peas or beans. In most instances only a small quantity of hail falls, but in regions subject to hailstorms, the crops of large areas may be seriously damaged or entirely destroyed. In 1880 a hailstorm in the central part of Wisconsin damaged or destroyed crops over an area of forty square miles, but it is seldom that so large an area is affected. The hail usually falls over a long and narrow area, leaving the region on each side untouched. From this fact, the hail is supposed to be formed on one side of the rain cloud.

Farmers in regions subject to hailstorms protect themselves by hail insurance, which throws whatever loss may occur upon all the farmers of the region instead of upon those whose crops are destroyed. Each farmer insured pays a small premium, and the premiums constitute the fund from which the insurance is paid.

Formation of Hail. Many theories have been advanced to account for the formation of hail, but the best authorities on weather conditions do not consider any of them satisfactory. Nearly all hailstones consist of hard ice formed around a center of white or soft ice, or around some other object, as a grain of sand or a small pebble that has been carried up to the cloud by the wind. Large hailstones are formed of numerous layers of ice, one over another, and their structure leads to the inference that they are blown about alternately into warm and cold currents of air, or from regions where rain is formed to those where snow is formed.

The approach of a hailstorm is indicated by large masses of cumulus clouds (thunder clouds) which are violently agitated by the wind. Most of the severe hailstorms occur between 10 A. M. and 4 P. M. It was formerly supposed that hail could be prevented by firing cannon or discharging explosives, the theory being that the agitation caused by the explosion would prevent the formation of hailstones. Scientists never accepted this theory, and careful experiments have shown that it has no foundation.

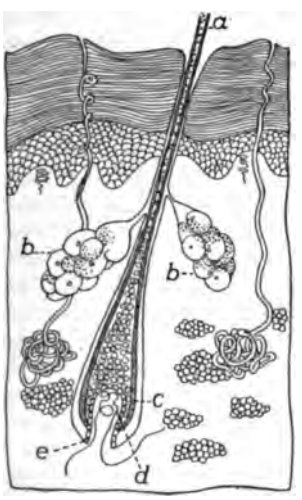
Snow consists of collections of frost crystals, and requires a lower temperature for its formation. See DEW; RAIN; SNOW. W.F.R.

HAIL COLUMBIA, a patriotic American song written in 1798 by Judge Joseph Hopkinson. Gilbert Fox, a young American actor, was to be given a benefit at the Old Walnut Street Theater, Philadelphia, and wishing to make the occasion a memorable one he requested his friend, Hopkinson, to write a song whose spirit would be wholly American. The result was *Hail Columbia,* which Mr. Fox sang on the night of April 28, 1798, to the tune of *The President's March,* accompanied by a full band and assisted by a large chorus. The tune known as *The President's March* was composed in 1789 by Franklin Fyles, an orchestra leader of New York, and was dedicated to President Washington. Owing to the political unrest of the period, *Hail Columbia* became very popular at the time of its introduction, and has still a certain vogue, due more to its spirit of patriotism than to any poetic merit. The first stanza follows:

Hail, Columbia! happy land!
Hail, ye heroes! heaven born band!
Who fought and bled in Freedom's cause,
Who fought and bled in Freedom's cause,
And when the storm of war was gone,
Enjoyed the peace your valor won.
Let independence be our boast,
Ever mindful what it cost;
Ever grateful for the prize,
Let its altar reach the skies.

HAILEYBURY, *hay'li bur ee,* a town in Ontario, the judicial center of the Timiskaming district, and a shipping and supply point for the famous Cobalt section. It is situated on Lake Timiskaming and on the Timiskaming & Northern Ontario Railway, five miles north of Cobalt, six miles south of New Liskeard and 107 miles north of North Bay. Steamers run between Haileybury and other towns on the lake. There are large lumber and sawmills and other industrial establishments. The town is the seat of a Roman Catholic bishop. The courthouse, jail and armory, all completed in 1916, and the bishop's palace are the conspicuous buildings. Haileybury has a general hospital and electric light and power, and owns its water and sewerage systems. Population in 1911, 3,874; in 1916, about 5,000.

HAIR, an outgrowth from the skin, which covers the bodies of mammals and varies from softest down to the coarse, stiff quills of the porcupine or the bristles of the hog. As a body covering, the hair of mammals corresponds to the feathers of birds and the scales of reptiles, though entirely different in structure. Among human beings hair grows most abundantly on the head, where it serves as a protection and as an ornament. The very fine, short, downy hair that is found distributed over the body, except on the palms of the hands and the soles of the feet, is doubtless a relic of the shaggy covering of primitive man. Civilized beings have made clothes serve for warmth and protection.



ROOT OF A HAIR

(*a*) Hair; (*b*) oil glands; (*c*) hair follicle (the depression from which the hair grows); (*d*) papilla (connective tissue which extends into and nourishes the roots of a hair); (*e*) growing cells.

The hair of animals has many economic uses. That of the horse and ox, for instance, is used in upholstering, the short hair being manufactured into curled hair for stuffing, and the long, straight hair being made into haircloth for seating. Horsehair also furnishes bristles for brushes. The fur of a large number of animals, the wool of sheep and several species of goat, and the hair of camels, are all of great value to man, who has learned how to utilize them in making clothing.

The Structure of a Hair. On the outside a hair is covered by a layer of fine scales that overlap like the tiles of a roof, but with the free ends turned upward. This external part is called the *cuticle.* Beneath is a thicker layer of horny cells of the *epidermis,* or outer layer of the skin; these cells form delicate fibers that are closely packed together and usually occupy the whole inside of the hair.

A hair consists of two parts, the root and shaft. The latter is the part outside the skin, or the free end. Though usually the shaft is rounded, in some persons and races it is flattened. Because of the unequal growths at the different angles, flattened hair has a tendency to curl. The root, which is shaped like a pear, extends down into a pocketlike sac, or hair *follicle,* on the bottom of which is a small projection called a *papilla.* This papilla is supplied with blood vessels, which furnish the material necessary for the growth of the hair.

How Hair Grows. It is by production and growth of cells from the surface of the papilla that hair is formed. It grows, then, from the roots, and not from the ends. As new cells develop they push forward the old ones, which become a part of the shaft. Since the cells are pressed together lengthwise they are drawn out into threads, instead of sidewise, and therefore the hair increases in length but not in diameter.

Hair will grow as long as the follicle and papilla are not destroyed. The life of a hair is from two to four years, and when an old one falls out a new one takes its place. Until after the prime of life and under normal health conditions there is a constant renewal of the supply. Premature baldness is generally caused by lessened circulation of the blood in the scalp or by certain forms of scalp conditions, such as dandruff, which kill the sources of nourishment and growth. It is also due to neglect of the scalp.

Color of the Hair. In the horny cells is deposited the coloring matter, or pigment, which gives the hair its particular color—brown, black, reddish, etc. For the production of coloring matter it is necessary that the whole body be in a good state of health. Age, illness, worry and sorrow lessen the secretion of pigment and cause the hair to turn gray or white, and there are cases on record of hair

turning white in a single night. In older hairs, also, air spaces sometimes form, and these, by reflecting the light, give to the hair a grayish appearance.

Why Hair "Stands on End." In Shakespeare's *Hamlet* the ghost of Hamlet's father tells his son that if he were not forbidden to do so he could unfold a tale that would make "each particular hair to stand on end like quills upon the fretful porcupine." This is a condition everyone has experienced, and it is due to the contraction of tiny muscles that run out in a slanting direction from the hair follicles. These muscles are likely to contract when a sensation of chilliness is felt or when sudden fright or other mental shock is experienced. For the same reason the fur on the cat's back bristles up until pussy looks much larger than her normal size.

Care of the Hair. Opening into the follicles from the sides are tiny glands that produce an oily substance which keeps the hair soft and flexible. Frequent brushing helps to keep it in good condition by distributing the oil through it, and brushing also keeps the hair and scalp free from accumulations of oily waste matter and skin scales. A moderately-stiff, flexible bristle brush is preferable to a wire brush, as the latter will scratch and irritate the scalp and is liable to pull the hair out. Unhealthy conditions of hair and scalp are readily transmitted; therefore everyone should have his own comb and brush, and these should be kept scrupulously clean.

Long hair should be washed about twice a month and short hair once a week. It is not necessary to use "patent" shampoos, for an excellent and harmless hair wash can be made from warm water and a pure soap. The hair should always be rinsed thoroughly, for particles of soap left in it are convenient lodging places for dirt and dust. Hair tonics, pomades and oils are unnecessary, often harmful, and seldom useful. Cleanliness, care and common sense are the best tonics. If the hair seems dry and lifeless it can usually be helped by massaging the scalp with the finger-tips to stimulate the circulation. Massage will also aid in keeping it in good condition.

Hair Dyes are preparations for changing the natural color of the hair. Solutions of salts of silver, mercury, lead and bismuth, all of which darken the hair, and peroxide of hydrogen, which produces a golden tint, are in general use. A wash made by steeping leaves of the henna plant will turn the hair red. The most permanent method of dyeing the hair to soak it with a solution of sulphide of pot sium, and before it is entirely dry to wet thoroughly with a solution of nitrate of silv Such a dye need be renewed only as the n hair comes in. Hair dying is at the best u satisfactory, and many coloring preparatio contain poisons that cause disease, or kill injure the hair. W.A.E.

Consult Mueller's *Hair;* Kidd's *Direction Hair in Animals and Man.*

Related Subjects. Further information rela ing to the topic will be found in these articles:

Baldness	Felt
Bristles	Fur and Fur Trade
Dandruff	Wool

HAIRDRESSING. From very remote time and among all peoples, much time and atte tion have been devoted to the arrangement the hair. Examples of ancient art show styl of hairdressing which, in some cases, we intended to be purely ornamental and in ot ers had some traditional significance and we designed to indicate the age or rank of t wearer. The Egyptian style was extreme varied, and wigs were in general use. Amo the Greeks in the sixth century B. C., an orna coiffure was common to both men and wome but in the fifth century the men wore the hair in its natural curls, or cut very sho while the women followed more elabora styles. The custom of wearing false hair ov plentiful natural hair originated in Asia, w adopted in Greece, and was for a time ve popular. Prior to about 300 B. C. the Roma with the exception of warriors and craftsme wore long hair. Simple hairdressing was use among the Roman women until the ti of Augustus Caesar, after which more ela orate styles were adopted.

Medieval hairdressing was very simple, b the fourteenth century saw the developme of more elaborate fashions. During the f teenth and sixteenth centuries the men wo their hair rolled back from their foreheads a manner suggestive of the pompadour of later period. Their beards were treated wi some stiffening substance and curled so as radiate in a fanlike manner. The women the period ornamented their great volume curled hair by a broad cushion, or coron The introduction of long, curled wigs appe to have been due to the desire of the courti of Louis XIV to imitate his naturally lo and abundant hair. The use of wigs was w established about 1650, and from that time f

st a century dressing of the natural hair en was dispensed with. The coiffure of n during a part of this period was ex- ly becoming. The curled hair, falling on ck and bare shoulders, was covered with pe veil. The close of the seventeenth y saw the introduction of the tall head- s of lace and stiffened muslin. In the ning of the reign of Louis XVI hairdress- ached a hitherto unknown degree of fan- extravagance, and in 1750 women wore e edifice of curls, supported by stiffening s, and surmounted by a little hat or cap. tyle prevailed in which this hat was re- l by a model of a ship of war.

se extremes were gradually abolished, n the nineteenth century short hair and elaborate style of arranging it were in among the men. Women also wore hair very simply, allowing it to fall at des in a mass of curls and confining it back of the head with a ribbon. Later, ide curls were dispensed with, and the ras arranged on the top of the head. At ime the style known as the *chignon* was luced, and this consisted of an arrange- of the hair over a large roll, or cushion. g the last few years the false-hair indus- try has suffered a marked decline, due to the prevailing simplicity of coiffures.

Among the Moki Indians of the Southwest- ern United States, as soon as a girl reaches the marriageable age she dresses her hair fantasti- cally in two round knobs above the ears; this style she continues until she becomes a wife (see illustration, under HOPI). J.S.C.

Consult Rhead's *Chats on Costume.*

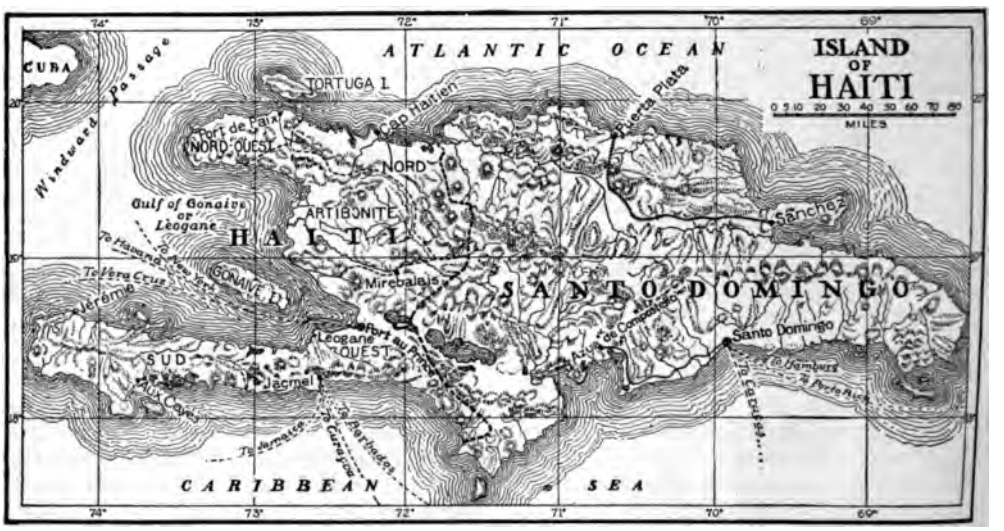
HAIRWORM, a long, threadlike, harmless worm, often seen in fresh-water pools or ditches by the roadside after a rain. Children sometimes believe that these worms develop from horsehairs, which they greatly resemble, but in reality they are found in the bodies of insects, where they pass their young or larval stage as parasites. When full grown they es- cape to the water, for they need a great deal of moisture, and deposit their eggs in slender strings twisted around the stems of water plants. The young hairworm, on hatching, sinks to the bottom of the pond, seeking an insect in which it can live until mature.

HAITI, *ha'ti,* one of the West Indies, and, next to Cuba, the largest of that group of islands. It covers an area of 28,000 square miles, and is therefore half the size of the

state of Wisconsin. It lies almost in the middle of the chain of the West Indies, between Porto Rico and Cuba, from which it is separated by the Windward Passage, fifty miles in breadth. Haiti Island is politically divided into two republics, Haiti on the west and Santo Domingo on the east. The surface is mountainous, with fourteen distinct ranges, attaining their greatest elevation in Loma Tina, a peak 10,300 feet high. The island is drained by forty-seven small rivers, few of which are navigable except by canoes and small boats. The Juna, flowing into Samana Bay on the east, is navigable for some distance inland and has considerable commercial importance.

Climate. The rainfall is excessive, but on the whole the climate is healthful. The rainy season lasts from May to October. The annual average temperature is about 90° F., and the thermometer seldom registers below 75° on the low-lying portions of the island. Hurricanes are frequent, but not so violent as in some others of the West Indies.

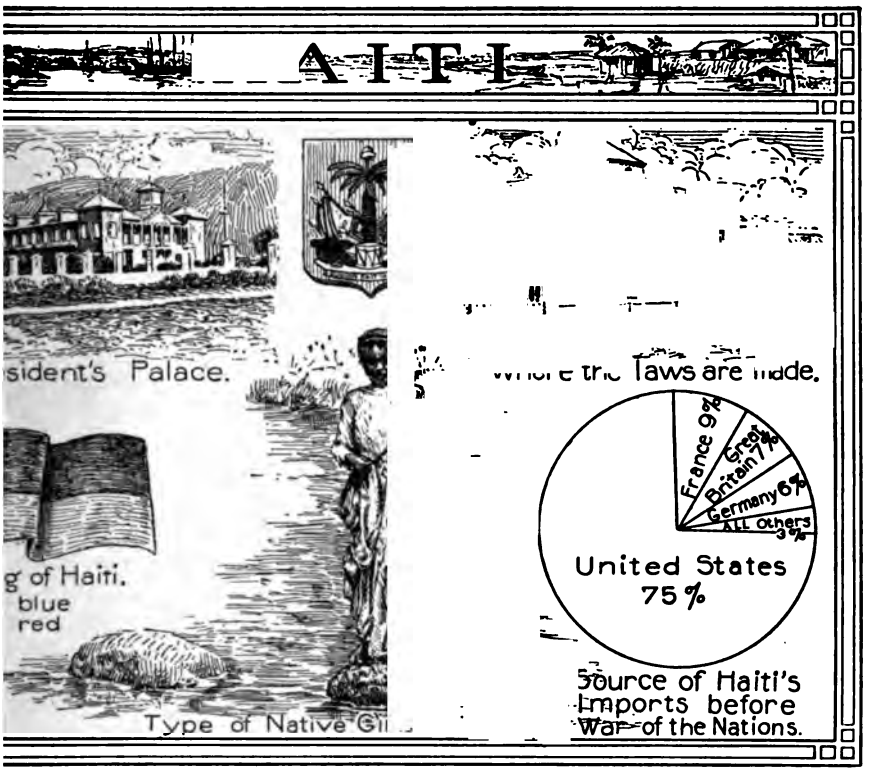
Republic of Haiti. The republics of Haiti and Santo Domingo, although close neighbors, are divided by feelings of bitter animosity. Haiti occupies only one-third of the island, and its people resent the nearness of the Dominicans, as the people to the east are called. The Republic of Haiti occupies the position of being the earliest state to be constitutionally



THE ISLAND AND THE TWO REPUBLICS

Resources. The soil is extremely fertile, and Haiti excels in the variety and richness of its vegetable products. Cotton, cocoa, tobacco, rice, arrowroot, manioc, coffee, sugar canes and many varieties of tropical fruits and flowers grow in great abundance. All vegetables found in temperate climates are also successfully cultivated. The extensive forests contain valuable woods, such as mahogany, satinwood, rosewood, cedar and logwood. On the mountains oaks and pines are found. The mineral wealth is great, but is as yet almost undeveloped. Iron, silver, tin and platinum are found, and will provide good fields for future investment. The surrounding waters abound in fish, and wild hogs in great numbers roam the forests and marshes. These hogs are hunted and furnish an important food supply.

governed by negroes. The experiment, if it can be called such, has been fairly successful, but corruption has done much to prevent any great achievements, and revolutions have been almost of annual occurrence. The constitution, language, laws and traditions of Haiti are of French origin. The military element predominates, and the army has long ruled the country. There is not enough local capital to develop the resources, a condition due to fear of investment under an unstable government. Most of the natives who are not given to military pride are inclined to laziness and superstition. The mystic rites of voodoo still exercise their weird influence over all classes of the community, although the Roman Catholic has been the nominal state religion since 1869, and the priests have fought



tion. The pure-blooded negroes majority, and they dislike the who comprise about ten per cent ation. See MULATTO.

From the time of its discovery by 1492 Haiti has been a political . It was then inhabited by about ians, most of whom were later ex- by the Spaniards. Slaves were om Africa as early as 1512, and lants now occupy the island. In century companies of English, Spanish settled there or made it arters while they carried on pirat- ons among the neighboring islands. western part of the island was nce.

flourished, but in 1791 an insur- ed by Toussaint L'Ouverture ended row of the French and a declara- endence. L'Ouverture was treach- d and taken to France, where he Another insurrection then broke e French were driven from the a that time until the present the he republic has been a series of and internal dissensions. In 1914 a revolution occurred, during which the President of the republic was deposed, and his place was taken by the leader of the army. This President was assassinated early in 1915, and a state of anarchy existed in the republic until troops were sent by the government of the United States to restore order. The American naval officers were forced to assume control of the customs department to bring order to the finances of the republic. The population is about 2,030,000. F.ST.A.

Consult Leger's *Haiti, Her History and Detractors;* Pritchard's *Where Black Rules White.*

Related Subjects. The following articles in these volumes, even when they do not deal specifically with Haiti, will throw light on the history and the life of the republic:

Cocoa	Santo Domingo
Coffee	Sugar Cane
Columbus, Christopher	Tobacco
Cotton	Toussaint, François
Mulatto	Dominique

HAKE, a large food fish of greedy habits, which preys upon smaller species of fish. It belongs to the cod family, and has a moderately-long body and a pikelike head, but no barbels. There are only four species of these codlike fishes, called the silver hake, the New

England hake, or whiting, the common European hake, which may be found as far north as Greenland, and the California, or merluccio, which is found from Santa Catalina to Puget Sound, on the Pacific coast. The New England hake, as well as the silver species, are common from Newfoundland to the Bahama Islands. The flesh is somewhat coarse and of watery texture, and for this reason is not highly esteemed for the table.

HALCYON, *hal'se on,* an old name for the kingfisher, a bird, of the grebe family, which lays its eggs in nests which are really floating islands made of plant stems, grass and reeds. In folklore or fable this bird was said to have the power of quieting the winds during the time of incubation. The term *halcyon days* arose from this fancy, and is used to denote the seven days preceding and the seven following the shortest day of the year, because calm and beautiful weather generally prevails at this period. The poet Bret Harte applies it in the following lines:

> Thou bring'st me back the halcyon days
> Of grateful rest, the week of leisure.

HAL'DIMAND, Sir Frederick (1718-1791), a Swiss soldier of fortune and British colonial administrator, who held important commands in America during the French and Indian Wars and the Revolutionary War, and was Governor-General of British North America from 1778 to 1784. Haldimand was born in a village near Neuchâtel, Switzerland, and as a young man served in the Sardinian and Prussian armies. He entered the British service in 1756, and held various commands in America until shortly after the beginning of the Revolutionary War, when he was recalled to London to act as the government's adviser on American affairs. He was sent to Canada as Governor-General in 1778. There he kept a firm hand, and according to French-Canadian historians a harsh hand, on the sympathizers with the rebelling colonists. More important was the encouragement and help he gave to thousands of United Empire Loyalists. Haldimand's efforts were largely responsible for the successful settlement of these people in Canada.

HALE, Edward Everett (1823-1909), a brilliant lecturer, able writer, clergyman and philanthropist. He has been called "The American Defoe," because his romances run along in such a straightforward way that the reader is inclined to accept them as facts. His masterpiece, *The Man Without a Country,* was widely read during the War of Secession sales of the book increased again durin Spanish-American conflict. It is said to done more than any other book to stin and intensify American patriotism. The was accepted in such sober earnest that in a later edition the author felt obliged to state in an appendix that it was not founded on fact.

EDWARD EVERETT
One of the best lov New England's notable of literary men.

The Man Without a Country. The Man Without a Country was a young army officer who, during the War of 1812, was tried by court-martial for an offense, and upon asked if he wished to say anything to that he had always been faithful to the U States, cried out in a fit of frenzy, "Dam United States! I wish I may never he the United States again!" The military ordered that he should be sent out to se kept there, where he would never hea name of the United States again. He wa on board ship, and instructions were i that no one should convey to him any or mention the United States in his pre He was transferred from one ship to an as the vessels neared the United States, in this way he was kept out of sight and ing of his country for many years. O deathbed he begged for news from home requested that a stone be set up in his r ory, bearing this inscription:

> In Memory of
> PHILIP NOLAN,
> Lieutenant of the Army of the United Stat
> He loved his country as no other man has l
> her; but no man deserved less at her han

Life of Hale. Dr. Hale's family was a r one, and several of his immediate rela find prominent places in American biogr His father was Nathan Hale, first editor o *Boston Daily Advertiser;* Nathan Hale, patriot and martyr, is of the same line; Edward Hale, one of the most accomplish American orators, was of the same family.

Dr. Hale was graduated from Harvard lege in 1839, and became pastor of a Unit

'orcester, Mass., in 1846. He re-oston ten years later and took e South Unitarian church, where active pastor for forty-five years. long list of magazine articles, he or of over fifty books. He wrote ays, novels, poems and short sto-ind that are helpful to his fellow-latter form of literature he ex-vas influential in advancing many progressive movements. He was dvocate of universal peace, and on, by a supreme court, of all disputes. His books *Ten Times* nd *In His Name* led to the found-King's Daughters, Lend-a-Hand, aritable clubs. Among his most ritings are *Philip Nolan's Friends, f Massachusetts, A New England emoirs of a Hundred Years,* and *His Friends.* For the last six years was chaplain of the United States vas a notable figure at the nation's gh those last years.

st eighty-seven years of age when June 10, 1909.

ATHAN (1755-1776), an American ie Revolutionary period, who suf-te of a spy and faced death with at has made him one of his coun-heroes. Nathan Hale was born on 5, at Coventry, Conn. He was ool at New London when the Concord and Lexington "fired the round the world." In the follow-joined a Connecticut regiment of with the rank of first lieutenant. 1776, he was commissioned a cap-regular army, and during the fol-g and summer was on duty in the New York City.

gton's call for a volunteer to enter ines to secure needed information, his services. In the disguise of a lmaster he visited all the enemy's ew York and Long Island, made the fortifications, and obtained the ght. On the night of September 21, s planning to return, he was recog-ptured, and the following morning shameful but inevitable lot of a g on the scaffold. His farewell is mother and the young woman marry were destroyed before his is said that his captors refused a clergyman or to permit him to see a Bible. Bravely facing death, the young hero uttered at the last the words that will ever be an inspiration to young Americans: "I only regret that I have but one life to lose for my country."

NATHAN HALE
Statue by MacMonnies, in New York City.

In City Hall Park, New York City, probably near the spot where he lost his life for his country, a beautiful statue, designed by Frederick MacMonnies, has been erected to the memory of Nathan Hale. The city of Hartford, Conn., has honored him with a like memorial.

Consult Lossing's *The Two Spies, Nathan Hale and John Andre;* Partridge's *Nathan Hale, the Ideal Patriot;* Holloway's *Nathan Hale.*

HALÉVY, *ah lay ve',* LUDOVIC (1834-1908), a French novelist and dramatist, who wrote in connection with Henri Meilhac the serious though sensational drama *Frou-Frou* in 1869, which was one of the greatest theatrical successes of the century. He was born in Paris and first achieved fame as part author of the librettos for Offenbach's light operas, such as *La Belle Helene, La Barbe Bleue* and *La Périchole.* These, as well as many farces, were the joint work of Meilhac and Halévy; from a literary point of view their best work is *Tricoche et Cacolet* and *La Boule.* He wrote novels without collaborators; *L'Abbé Constantin* and *Criquette* are best known. In 1884 he was elected to the French Academy, was previously made chevalier of the Legion of Honor and became commander in 1900.

HALF'TONE, a process of photo-engraving for reproducing drawings, paintings, photo-

graphs and the like. Halftones are extensively used in the illustration of books, magazines and newspapers. A zinc etching (which see) will reproduce solid masses of black or white, and will show separate lines, but it will not show gradations of tone; in a zinc etching everything is either black or white. A halftone takes its name from the fact that it does actually show the middle or *half* tones of a picture. This is accomplished by means of a glass *screen,* which causes the essential difference between a halftone and any other form of photo-engraving.

If a halftone is examined with a magnifying glass it will be seen to be a mass of tiny dots, which are caused by the screen. A piece of the finest sheet glass is covered with a varnish of wax and asphalt, and is then ruled diagonally with minute lines; the number of lines may be as many as 300 to the inch, but is usually not over 150 or 200. The greater the number of lines the finer will be the resulting halftone. The ruling is done by an automatic machine carrying a diamond-pointed graver, or cutter. The plate is treated with hydrofluoric acid, which eats or bites into the lines where the graver has scraped away the varnish. The lines are later filled with an opaque coloring matter which is hardened in the plate by baking in an oven. Another plate similarly prepared is then cemented to the first plate in such a way that the lines on one are at right angles to the lines on the other. The two plates thus form a screen, in which the transparent parts are separated by tiny dots and occupy about one-third of the entire surface.

A photograph of the picture or object to be reproduced is taken through the ruled screen, which is placed at a proper distance in front of a sensitive plate. When the plate has been exposed the result is a photographic negative, composed of rows of small dots at regular intervals. The dots are uniform in size, but vary in blackness or intensity with the relative high lights and shadows of the original. After the negative is developed a print from it is made on a copper plate, which has been specially prepared with a coating of fish glue, albumin, water and bichromate of ammonia. Where the dots on the photographic negative allow light to pass through, this mixture will harden, and the rest of the coating is then washed off in water. The plate is etched in an acid bath, but the acid affects only those parts which are protected by the hardened fish glue and albumin.

The etching of a halftone requires great skill, and several bitings are usually necessary before the plate shows the proper gradations of tone. An indefinite number of electroplates (see ELECTROPLATING) can be made from the original halftone. The halftone or the electroplates can be placed on a press, either with or without type matter. A halftone requires a very smooth (highly finished) paper for good results. W.F.Z.

HALIBURTON, *hal' i bur tun,* THOMAS CHANDLER (1796-1865), a Canadian humorist and jurist, best known by his pen name, SAM SLICK. Haliburton was born at Windsor, N.S., and attended King's College in his native town. He was called to the bar in 1820, was appointed chief justice of the Inferior Court of for the Middle Common Pleas Division of Nova Scotia in 1829, and in 1841 became a judge of the provincial supreme court.

THOMAS C. HALIBURTON

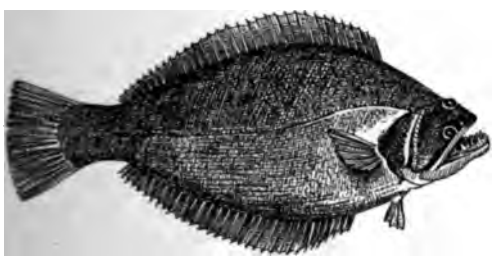
After serving with distinction on the supreme bench for fifteen years he resigned and removed to England, where he was from 1859 until a few months before his death a Conservative member of the House of Commons.

Despite his brilliant career as a jurist it is as a humorist and satirist, under the above pen name, that he is best remembered. The Sam Slick sketches, which first appeared in a local paper, pictured a Yankee clockmaker, whose shrewd sayings and knowledge of human nature won immediate recognition. These sketches were collected and published in 1837 under the title of *The Clockmaker, or Sayings and Doings of Samuel Slick of Slickville.* A second series of Slick stories appeared in 1838, and a third in 1840. Judge Haliburton also wrote *The Old Judge; The Letter Bag of the Great Western; Traits of American Humor;* and *An Historical and Statistical Account of Nova Scotia.* G.H.L.

HAL'IBUT, one of the largest and most prized of the family of flatfishes, the name being derived from the word *holy,* since long ago it was extensively used for food upon holy days. It is a member of the *flounder* family and is characterized, as are other flatfishes, by

having both eyes on one side of the head instead of upon the two sides. The halibut is most frequently found in the higher latitudes, on the northern coasts of America, Asia and Europe.

Among the true fishes the halibut is equaled in size only by the tarpon, tuna and swordfish, and frequently weighs from 300 to 400 pounds, though averaging from fifty to seventy-five pounds. It is taken with great hooks and lines



FORM OF THE HALIBUT

or trawls. When sold in the markets it is cut in large slices, or steaks, and the fish, when cooked, has a mild, pleasant flavor, unlike fish that contains more oil. The food value of halibut is greater than that of cod, and less than that of mackerel or salmon.

The halibut fisheries of Queen Charlotte Islands in British Columbia are the richest in the world. Most of the 60,000,000 pounds of fresh halibut which are eaten each year in the United States and Canada, even on the eastern seacoast, comes in refrigerator trains from the Pacific. About 20,000,000 pounds are frozen and kept for the winter. The Canadian catch is about 16,000,000 pounds, the American about 50,000,000 pounds; but about one-fifth of the latter is landed in Canada. See FLATFISH.

HAL'IFAX, one of the most important centers of the English woolen and worsted industries. It is situated in West Riding, in the County of York, 194 miles northwest of London, at the junction of two small rivers called the Hebble and the Calder. The city is of modern appearance, and has some fine buildings, most notable of which are the town hall and the Piece Hall, the latter erected in 1799 for the storage and sale of piece goods, and covering over two acres of ground. Halifax is essentially an industrial city and in addition to carpets, for which it is noted throughout the world, produces and exports large quantities of machinery and iron and steel goods. Extensive collieries and quarries of freestone are operated in the neighborhood. Population in 1911, 101,553.

HALIFAX, the capital of Nova Scotia, the county seat of Halifax County, the largest city of the Maritime Provinces and the greatest Canadian port on the Atlantic seaboard. The city lies on the east coast of the Nova Scotia peninsula, about midway between Cape Canso, at the north end, and Cape Sable, at the south. Its latitude is slightly lower than that of Montreal, and is about the same as that of Portland, Ore. By the shortest rail lines Halifax is 730 miles northeast of Boston, 958 miles northeast of New York, 756 miles east of Montreal and 674 miles east of Quebec. Its population was 40,832 in 1901 and 46,619 in 1911; in 1917 it was estimated at 53,556.

General Description. Halifax lies on the east slope of a hill which forms a small peninsula in Halifax harbor. The summit of the hill is 225 feet above the sea. Halifax is now, and has been since its foundation in 1749, a great fortress. It is popularly ranked second in strength only to Quebec. The secrets of its defenses, however, are well guarded, especially since the beginning of the War of the Nations. Halifax is not merely a great fortress and the chief naval station in British North America, but it is a center of trade and industry. It handles practically all of Nova Scotia's foreign trade, and in winter, when the Saint Lawrence is closed by ice, also has the trade of Montreal and Quebec. It is a railway center of considerable importance, being the terminus of the Intercolonial, the Canadian Pacific, the Halifax & Southwestern, and the Dominion Atlantic railways. The harbor of Halifax is one of the finest in the world. It is about six miles long and one mile wide, and has deep anchorage throughout. To the north it is connected by a narrow channel with Bedford Basin, six miles long and four miles wide, and deep enough for the greatest ships afloat. McNab's Island, lying across the mouth of the harbor, divides it into two entrance channels, of which only the western is navigable for vessels of deep draft.

Harbor Development. Halifax is the Canadian port nearest Europe, and is also several hundred miles nearer Europe than any port in the United States. It has a further advantage in that its harbor, unlike that of Montreal or Quebec, is never closed by ice. For these reasons the Canadian government determined to spend $30,000,000 in the improvement of the harbor and terminal facilities at Halifax. The chief objection to this develop-

ment was the added cost of the long railway haul from the interior of Canada, but it is believed that the terminal costs can be kept low enough to counterbalance this charge and still yield a proper return in proportion to the capital expenditure.

For many years the railway terminal piers were located on the north water front, but under the new plans, announced in 1912, these are on the south water front. In 1914 construction work was begun on this task, which involved the relocation of the railway lines within the city limits and the construction of a new depot and new docks. The landing quay will be 2,000 feet long, and each of the six piers will be 1,250 feet long by 360 feet wide, with deep basins 275 feet wide. Halifax will have what no great port in the United States has—direct, main-line railway connections both for freight and passengers to the very edge of the wharves. Steamers will dock at one end of the terminals and transcontinental trains will start at the other. When these improvements are completed it will be possible to journey without a break from the Victoria Docks in London, via Halifax and Vancouver, or Prince Rupert, to Hongkong.

Features of the City. Halifax, besides its large trade in apples, fish, lumber and other products of Nova Scotia, is important as a manufacturing center. Its chief industrial establishments are iron foundries, machine shops, a cotton mill, the largest sugar refinery in Canada, and boot and shoe factories. Conspicuous among the public buildings are the provincial Parliament building, government house, post office, custom house and city hall. Also noteworthy are the military barracks overlooking the harbor, Victoria General Hospital, Nova Scotia Technical College, Convent of the Sacred Heart and the splendid new buildings of Dalhousie University (which see). Among the educational institutions are Saint Mary's College, the Halifax Ladies' College and Conservatory of Music, schools for the blind and deaf, Presbyterian and Catholic theological schools and the Royal Naval College of Canada.

Halifax is the seat of the Anglican archbishop of Nova Scotia and the Roman Catholic archbishop of Halifax, and the cathedrals of these two are imposing structures. Beautiful parks and public gardens, the new civic park on the northwest arm, with its massive memorial tower commemorative of the origin here, in 1758, of the British colonial system of representative government, street railways, modern water, sewerage and electric lighting systems, all contribute to the comfort of Haligonians, and the yachting, bathing and general attractiveness of the city and its surroundings make it a popular summer resort.

History. Halifax was founded by the British in 1749 as a rival to the French fortress of Louisburg (which see). It was named for George Montagu, Earl of Halifax (1716-1771), who was at that time president of the British Board of Trade. Halifax was an uncle to Lord North, who played so important a part in the affairs of England a few years later. The ancient citadel of the fortress remains, but there is also a ring of a dozen forts to guard the city. In 1750 Halifax supplanted Annapolis as the capital of the colony. During the Revolutionary War it was an important supply base for the British, in the War of 1812 it was an outfitting point for privateers, and during the American War of Secession it was frequented by Confederate blockade-runners. It was garrisoned by British troops until 1906,, when the responsibility for defense was assumed by the Canadian government.

Halifax has been preëminently a banking center. It is the home of two of the largest chartered banks of the Dominion, and is the wealthiest *per capita* Canadian city. It is known far and wide as the "Atlantic Gateway" of Canada. It is the nearest to Great Britain of any city on the American continent, being but 2,187 miles from Cape Clear. The exports from the port of Halifax for the last three years indicate an astonishing development, being for the years 1913, 1914 and 1915 respectively, $15,467,270, $19,157,170 and $32,175,231. A.H.M.

HALL, ASAPH (1829-1907), an American astronomer who discovered two moons of the planet Mars. He was born in Goshen, Conn., became a carpenter, but entered Central College in McGranville, N. Y., in 1854, where he remained for over a year and then entered the University of Michigan. In 1863 he was made professor of mathematics in the naval observatory at Washington, but in 1891 left the government service with the rank of captain. He received appointment as professor of astronomy at Harvard in 1895, where he remained six years. The United States government sent him on several astronomical expeditions, among which were those to Bering Strait, in 1869, Vladivostok, Siberia, in 1874, and to Colorado in 1878, to observe the transit of Venus. The greatest of his discoveries was the two moons of

Mars, which he named Deimos and Phobos, but a more important contribution to science was his study of double stars. He received a gold medal from the Royal Astronomical Society, in 1875 was elected a member of the National Academy of Science and was made president of the American Association for Advancement of Science in 1902.

HALL, G[RANVILLE] STANLEY (1845-), an American educator and psychologist, who as president of Clark University, Worcester, Mass., has given that institution far-reaching influence in the development of higher education in America. He was born in Massachusetts, and was educated at Williams College and in Germany. Beginning his teaching career in 1872, as professor of psychology at Antioch College, Ohio, he became instructor in English at Harvard in 1876, and two years later finished a postgraduate course at that institution. In 1881 he became professor of psychology at Johns Hopkins University, where he remained until his election to the presidency of Clark University in 1888. In this university he also occupies the chair of psychology.

G. STANLEY HALL

President Hall has been one of the leaders in adapting methods of instruction to the facts of evolutionary and experimental psychology, and he is an authority in the field of child development. He was the founder and is the editor of the *American Journal of Psychology*, the *Pedagogical Seminary*, the *American Journal of Religious Psychology and Education*, and the *Journal of Race Development*. Among his publications are *The Contents of Children's Minds on Entering School*, *Adolescence*, and *Educational Problems*.

HALLAM, *hal'am*, HENRY (1777-1859), an English historian whose great work, *The Middle Ages*, was published in 1818. His sense of proportion and admirable arrangement are shown in his histories of France, Italy, Spain, Germany, and of the Greeks and Saracens. His logical arrangement of facts was due, no doubt, to his legal training. He was born at Windsor, studied law at Christ College, Oxford, and practiced law on the Oxford circuit for several years. He numbered among his friends Sidney Smith, Macaulay and Lord Tennyson. Tennyson's *In Memoriam* was written as a tribute of his friendship for Hallam's son Arthur, who died suddenly at the age of twenty-two. In 1830 Hallam and Washington Irving received medals offered by King George IV for distinction in historical writings. Among his works are the *Constitutional History of England from the Accession of Henry VII to the Death of George II*, and the *Introduction to the Literature of Europe in the Fifteenth, Sixteenth and Seventeenth Centuries*.

HALLE, *hahl'e*, or **HALLE AN DER SAALE,** *zahl'e* (Halle on the Saale), an important German city in the province of Saxony, on the River Saale, about twenty miles northwest of Leipzig. The town has an extensive trade and is particularly noted for its production of salt, which is found on islands in the river. The city's industries have been greatly developed since the Franco-Prussian War (1870-1871), and there are now more than fifty large establishments manufacturing machinery and other iron and copper goods. Chemicals, sugar, malt, spirits and starch are also produced. The town hall is a magnificent building dating from the fifteenth century, and near it stands a beautiful monument to Handel, the musician, who was born in this city. Population in 1910, 180,551.

University of Halle, one of the leading institutions of learning in Germany, was founded by the Lutheran Church in 1694. It quickly became the educational center of Protestant Germany, and in 1817 the ancient University of Wittenberg was incorporated with it. The university is prosperous and has recently become noted for the thoroughness of its instruction in agriculture. The students numbered about 2,000 before the War of the Nations in 1914.

HALLECK, *hal'ek*, FITZ-GREENE (1790-1867), an American poet whose chief claim to fame rests upon one patriotic poem, *Marco Bozzaris*. He was born in Guilford, Conn. He became a clerk in a New York bank, after which, for a long period, he was the confidential agent of John Jacob Astor and was named by him one of the original trustees of the Astor Library. In 1819 he collaborated with Joseph Rodman Drake in the humorous series of *Croaker Papers*, which appeared in the New York *Evening Post*. Drake's death in 1819 inspired Halleck's most beautiful poem, beginning "Green be the turf above thee." His other writings include *Fanny*, a satire on the follies,

fashions and celebrities of the day; *Alnwick Castle, Burns* and *Marco Bozzaris*. See BOZZARIS, MARCO.

HALLEY, *hal'i,* EDMUND (1656-1742), an English astronomer, the first to predict the date of a return of a comet, a prediction verified by subsequent visits of the comet that bears his name. After graduating from Queen's College, Oxford, he went to Saint Helena and spent two years on the island, compiling a catalogue of the stars of the Southern Hemisphere, which was published in 1678. He was later sent on a scientific expedition to the Pacific Ocean, but his crew mutinied and compelled him to return before his work was completed. He finished his task in a second expedition and was given the rank of captain in the British navy, with half pay for life. In 1703 he was appointed professor of geometry at Oxford and devoted much of his time to compiling the result of his researches on the orbits of comets. He became secretary of the Royal Society in 1713 and Astronomer Royal in 1721.

Halley's Comet. This comet, named after Edmund Halley, was rediscovered in 1682, when it was visible for about a month. Previous visits had been recorded in 1456, 1531 and 1607. Halley predicted that it would be a constant visitor, and in proof of the correctness of his calculations the comet reappeared in 1759, 1835 and 1910. This comet appears once in nearly seventy-six years; it will next be seen in 1986.

HALL OF FAME, a semicircular building of granite erected in 1900 as a memorial to famous Americans, on the grounds of the New York University, overlooking the Hudson River. It was established by a gift of $250,000, and consists of a museum of seven rooms on the ground floor, with a colonnade above, which is over 400 feet in length. Along the colonnade are 150 panels, in which the picture and the name and dates of birth and death of each person elected to a place in the Hall are to be placed.

In 1900 fifty names were to be chosen, and afterwards others were to be selected at the rate of five every five years; according to this plan, by the end of the century the 150 panels would be filled. The nominations of the public are invited, and these, after being seconded by the University Senate, are submitted to a board of one hundred judges chosen from all the states. Only names of persons who have been dead ten years or more may be considered, and fifty-one votes are necessary to a choice. At first only Americans born in the United States were eligible, but in 1904 a plan was announced to add a room with space for thirty which the pictures of foreign-born could be placed. In 1900, of the submitted, only the twenty-nine (... received the required number of vacancies were to be taken care ... elections. The first list follows:

George Washington	Nathaniel H...
Abraham Lincoln	George Peab...
Daniel Webster	Peter Cooper
Benjamin Franklin	Robert E. Le...
Ulysses S. Grant	Eli Whitney
John Marshall	John J. Audub...
Thomas Jefferson	Horace Mann
Ralph Waldo Emerson	Henry Ward ...
Robert Fulton	James Kent
Henry W. Longfellow	Joseph Story
Washington Irving	John Adams
Jonathan Edwards	William E. Ch...
Samuel F. B. Morse	Gilbert Stuart
David G. Farragut	Asa Gray
Henry Clay	

In 1905 the following were added:

John Q. Adams	Louis Agassiz
James R. Lowell	John P. Jones
William T. Sherman	Mary Lyon
James Madison	Emma Willard
John G. Whittier	Maria Mitchell
Alexander Hamilton	

In 1910 these were added:

Harriet Beecher Stowe	William C. Br...
Oliver W. Holmes	Frances E. W...
Edgar A. Poe	Andrew Jack...
Roger Williams	George Banc...
James F. Cooper	John L. Mot...
Phillips Brooks	

In 1915 seven new names were ...

Mark Hopkins	Charlotte Cu...
Francis Parkman	Rufus Choate
Elias Howe	Daniel Boone
Joseph Henry	

Under a new rule four persons were ... ered; two of them, John Paul Jones ... Williams, were not reëlected, so the ... ber is now fifty-six. Jones was rejected ... he had also served Russia, thereby ... in the opinion of many of the electors, ... of fortune. Williams failed of selection ... reason that ministerial names are not ... for the Hall of Fame. Charlotte ... (which see) was the first member of ... rical profession to be named.

HALLOWE'EN, *hal o een',* or **EVEN,** the evening of October 31, ... people a time for gayety and pranks, ... play at being witches, ghosts and fai... evening is so-called, however, because ... eve of the Christian festival of *All Saints* ... falls on November 1. It means *Holy Eve*

THE HALL OF FAME

On the grounds of Columbia University, New York City.

:h was set apart, as Lowell expresses
)em, *All-Saints,* to honor the mem-

—the unknown good that rest
s still memory folded deep.
ly dumb who did their deed,
)rned to blot it with a name;
e plain heroic breed,
ved Heaven's silence more than fame.

ling of bonfires, cracking of nuts,
r apples floating in tubs of water,
fortunes and ghost stories, which are
ve'en customs, are all relics of pa-
bout thirteen centuries ago pagans
November 1 as *All Spirits' Day,*
, both good and evil, were believed
arth. The Druids also celebrated
st festival about that time, and
e ceremonies were performed. Even
pagans adopted Christianity they
d many of their old customs, and
)we'en diversions of to-day are ones
nated centuries ago. In past years
ies peculiar to the occasion in Scot-
f a highly superstitious nature, and
rously describes them in his poem,

See illustration and program,

NATION, *hal lu se na'shun,* a men-
which a person is certain that he
or otherwise perceives something
not actually exist. That is, the ob-
seems to stimulate the organs of
imagined. Hallucinations are fre-
erienced by those laboring under
al strain, and they are common in
xication and insanity. Normal per-
r, often hear voices and see visions
sy interval between waking and

ion usually comes through the
ring; sight is next in order, and
smell, taste and touch. Probably
s experienced the common halluci-
aring the striking of a clock or the
usical instruments. A well-known
ple of hallucination may be found
ience of Joan of Arc, the French
who was inspired by heavenly
risions to save her country from
the English (see JOAN OF ARC).
on should not be confused with
ugh the two mental states are
d. In the latter case the person
nething that has reality, but does
nterpret, it correctly. A common

Hallowe'en Suggestions

Where the bee sucks, there suck I;
In a cowslip's bell I lie;
There I couch when owls do cry.
On the bat's back do I fly.—*Shakespeare.*

There is less of historical and educational interest in connection with this holiday than with most of the special days that are observed in schools, but the children find a peculiar fascination in its weird legends and in its time-honored symbols. Since there are so many of these symbols, the day lends itself especially to excellent "busy work." The pupils may make booklets in the shape of pumpkins, black cats, witches' hats or brooms, and these may serve as invitations to their parents to visit the school. Rows of brownies or fairies may also be cut from white paper and arranged about the top of the blackboards as a border. The following program makes use of many of the special elements that make the day attractive.

The Brownie Song.....*Gaynor*
Fairies of the Caldon Low.....*Howitt*
The Shoemaker and the Elves...*Grimm*
The Gifts of the Dwarfs.....
.....See article STORY TELLING
The Fairies.....*Allingham*
Dramatization of *Cinderella*
Reading from *Adventures of a Brownie*
.....*Craik*
Tam o'Shanter.....*Burns*
Frau Holle....See article STORY TELLING
Little Orphant Annie.....*Riley*
Jack o'Lantern Drill

example of illusion is the feeling of motion experienced by one sitting in a train which is not moving, when another train passes on a neighboring track.

Hallucinations, being effects rather than causes, cannot medically be treated. Physicians seek the basis of the disorder and, if that can be cured, hallucinations cease.

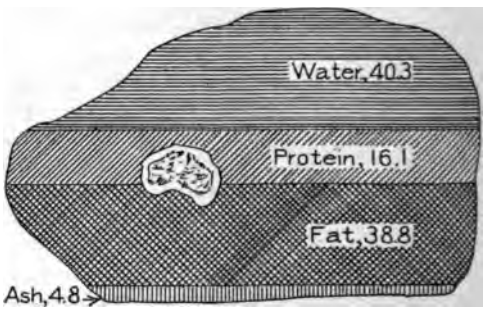
HA'LO, a word derived from the Greek name for a threshing floor on which oxen, going round and round, trod a circular path. It is now applied in astronomy to luminous rings round the sun and moon. Three of these circles of light are sometimes seen surrounding the sun. Halos are probably formed by the refraction of light from particles of ice and are most common in Arctic regions. In addition to the circle, a cross is sometimes seen, stretching beyond the limits of the halo, and on the bands of the cross occur parhelia or mock suns (see PARHELION). The band round the sun and moon is generally colored red on the inside, tapering off into orange, yellow and white at the edges. Coronas, sometimes called halos, are not really such, and are due to different causes (see CORONA).

The halo is much used in art, and since the fifth century few pictures of Christ or of a saint have been painted without a luminous circle nearly surrounding the head. It is regarded as an emblem of divinity and of purity or saintliness.

HALOGENS, *hal'o genz,* a name given to a group of four chemical elements which resemble each other in a general way as regards their physical and chemical properties and which form chemical compounds that also possess similar properties. These four elements are bromine, chlorine, fluorine and iodine, each of which is treated under its own title in these volumes. The name *halogen* is derived from the Greek words *hals,* which means salt, and *genis,* which means *to produce,* and signifies a sea-salt producer. These elements have been named halogens because they form salts which resemble common or sea salt, which is a compound of chlorine with sodium. See CHEMISTRY.

HALS, *hahlz,* FRANS (about 1584-1666), an artist who is regarded as the founder of the Dutch school of *genre* painting. As a portrayer of faces wreathed in laughter he has never been equaled, and his subjects of feasting exhibit great vivacity and spirit. His work is dedicated to themes suggestive of peaceful enjoyment and absolute placidity of purpose. Very little is known of Hals himself. He was born at Antwerp, and in his early manhood studied under eminent instructors at Haarlem. He is especially famous as a portrait painter; eight notable examples are preserved in the museum of Haarlem, the finest representing the officers of the corps of Saint Adrian. His *Mandoline Player,* now in the gallery of Amsterdam, is a typical example of his treatment of single figures. As a teacher, Hals exercised a marked influence upon the development of Dutch art. Several of his sons were artists, the most renowned being FRANS HALS, the younger, who lived about 1637 to 1669.

HAM, a meat obtained from the thigh of the hog, prepared for the consumer by the processes of salting and smoking. Ham is frequently known as lean pork, as distinguished from bacon, which is fat pork. The amount of



FOOD VALUE OF HAM

It has a heating value of 1,875 calories per pound, more than many other meats, and is therefore not in demand in warm weather.

fat in prepared ham varies, the average for medium-fat smoked ham being 33.4 per cent. The fuel value for the same product is 1,875 calories per pound (see CALORIE), as compared with 900 for medium-fat leg of mutton, and 840 for smoked beef. Ham is nutritious, but less digestible than bacon. It has an agreeable taste and flavor and is served in a variety of ways, fried ham being a staple breakfast meat, and cold boiled ham being equally popular for sandwiches and as a luncheon meat.

The curing of ham is an important branch of the meat-packing industry, and it is also a common farm industry. There are two methods of salting, the wet-salting, or pickling, method, and the dry-salting method. By the former the hams are kept in brine from a month to a month and a half, with occasional renewals of the pickling liquid. The dry-salting method consists in rubbing the meat thoroughly with salt, and repeating the process at the end of ten days and again at the end of another ten days. After the salting the hams are hung in smoke-

a smoldering fire is built beneath the
d the smoke ascends to the meat
holes in the flooring. The smoking
n 12 to 48 hours. The hams are then
wrapped up and, if intended for the
put in boxes for shipment. The large
usually have a brand burned in the
ore wrapping.

United States, the chief centers for
aration of ham are Chicago and Kan-
. Large quantities are produced for
nsumption and for export; about 166,-
pounds of hams and shoulders are sent
to foreign countries, representing a
nearly $24,000,000. Of this amount,
receives over 4,000,000 pounds, valued
ıry times at nearly $700,000. See MEAT
AT PACKING.

one of the three sons of Noah who
t with their father from the Ark after
d (*Genesis* VIII, 18) to establish new
Gradually the families of his two
, Shem and Japheth, moved to distant
Asia, while Ham settled in Canaan, and
reputed father of the African races.
f his descendants migrated into South-
bia, Ethiopia and Egypt. The entire
s called *Hamites,* for they still have
naracteristics in common, and there is
nilarity in their languages. See SHEM;
t; NOAH.

HAN, a royal favorite at the court of
otic Persian king Ahasuerus, who pro-
im to high rank, where all the princes
o his authority. His personal ambition
him to such an extreme that the king
him hanged on the gallows which he
had prepared for Mordecai, a Jew. The
"Hang as high as Haman," arose from
for the gallows which Haman ordered
r Mordecai was made unusually high,
was his intention that people all over
should see the death of the Jew.

the son of Hammedatha, the Agagite,
of lowly origin, so he felt very much
hen the king, soon after marrying the
l Jewess, Esther, raised him to an ex-
osition. Mordecai, a cousin and the
guardian of Esther, refused to bow to
which greatly angered the latter, so he
revenge by the massacre, not only of
ai, but of all the Jews in the Empire
III, 8-9). Then Esther, who had kept
onality a secret, risked her life by re-
it to the king and pleading for her
The monarch quickly saw the whole
nefarious plot and ordered his servants to hang Haman, while he raised Mordecai to high honors and allowed the Jews to go free. See ESTHER.

HAM'BURG (in German, *hahm'boorK*), the most important commercial center on the continent of Europe, and next to Berlin, the largest city in the German Empire. It is situated seventy-five miles from the North Sea port of

LOCATION OF HAMBURG

Cuxhaven, on the northern branch of the River Elbe, and 178 miles northwest of Berlin. The value of its shipping and commerce in normal times is exceeded only by London and New York. The city is crossed in all directions by canals, and is also intersected by the River Alster, which forms two large lakes or basins known as the Binnenalster and Aussenalster. More than sixty bridges cross the canals, and two splendid structures span the Elbe.

The commercial part of the town is old and possesses little beauty. The canals are lined by warehouses, to which lighters bring goods from the harbor, which is one of the best equipped in the world. The more modern portion surrounds the two basins of the Alster and contains many handsome buildings and beautiful promenades. The church of Saint Nicholas, a modern building erected at a cost of over $1,000,000 as a memorial of the fire which destroyed a great part of the city in 1842, is one of the loftiest churches in the world, with a spire 482 feet high. The city owns all public utilities, which are operated by companies paying high rentals for the privileges. Hamburg is one the largest of the world's coffee markets, and is also among the foremost cities in money exchange transactions.

The principal exports are sugar, coffee, woolen and cotton goods, ironware, machinery, tobacco and paper. The imports consist chiefly of raw products such as wool, hides, tobacco, iron, grain and coffee. One of the principal industries is shipbuilding; the largest vessels of the

German navy are built here in yards employing more than 5,000 men in times of peace. Population in 1910, 931,035.

Hamburg State. A free state of the German Empire containing the metropolitan district of Hamburg. It has an area of 160 square miles. It lies between Schleswig-Holstein on the north and Hanover on the south, extending to Cuxhaven at the mouth of the Elbe. Hamburg is a republic governed by a Senate and a House of Burgesses. The country districts are devoted to agriculture. The soil is very fertile and produces good crops of rye, barley, wheat and potatoes. In addition to Hamburg, the chief towns are Bergedorf, with 14,907 inhabitants, Ritzebuttel 3,140, and Cuxhaven, which became an important naval base at the beginning of the War of the Nations in 1914. Population of the state, exclusive of the city of Hamburg, 83,600.

HAMILCAR BARCA, *hah mil'kahr bahr'kah* (270-228 B.C.), a commander-in-chief of the army of ancient Carthage, whose wonderful military genius prepared the way for the founding of a new empire in Spain by his famous son, Hannibal. While still a young man he was given command of the Cathaginian forces in Sicily, shortly before the close of the First Punic War. Although the Romans were masters of almost the whole island, he conducted war against them with great ability for several years, making Rome tremble for the safety of its Italian possessions. In 241 B.C. the Carthaginian admiral, Hanno, was severely defeated, and Hamilcar Barca was compelled to leave Sicily. A revolt of the returned troops, in which they were joined by some native African tribes, was successfully repressed by him.

After the close of the First Punic War the Carthaginians determined to repair their losses by new conquests in Spain, and in 236 B.C. Hamilcar led the march westward, where for nine years he devoted his commanding genius to organizing the different Iberian tribes into a compact state. His great design of making Spain a point of attack against Rome was carried out by his son-in-law, Hasdrubal, and his son, Hannibal. See PUNIC WARS; HANNIBAL; CARTHAGE.

HAMILTON, ALEXANDER (1757-1804), an American statesman of the early national period, the first Secretary of the Treasury and one of the most able and farseeing officials who ever held that office. He took his seat in Washington's first Cabinet at a time when the treasury of the nation was empty and t government was without credit. How he quitted himself in the difficult rôle he v called upon to play is summed up in the e quent words of Daniel Webster:

> He smote the rock of the national resour and abundant streams of revenue gushed fo He touched the dead corpse of Public Credit, it sprung upon its feet.

Alexander Hamilton was born at Cha Town, on the island of Nevis in the W Indies, on January 11, 1757, an illegitimate of a Scotch trader. At the age of sixteen boy came to America to complete his edu tion, studying for a year in a grammar school at Elizabethtown, N. J., and then entering King's College (now Columbia University). The struggle of the colonies against England early enlisted his ardent sympathy, and before the opening of hostilities he published anonymously remarkable pamphlets in support of the pat cause. On the outbreak of the Revolution joined the Colonial forces and displayed s valor and coolness in Washington's New Jer campaign of 1776-1777 that the latter m him an aid on his staff, with the rank lieutenant-colonel.

ALEXANDER HAMILT

After the close of the war Hamilton took course in law, and in 1782-1783 represent New York in the Continental Congress. was keenly alive to the weakness of the gover ment under the Articles of Confederation a he bore a conspicuous part in the assembli of the Constitutional Convention of 1787, which he sat as one of the delegates from N York. No one labored more fervently than for the adoption of the new Constitution; masterly papers in its support, published *The Federalist,* and his speeches in the N York Convention which ratified it exerted tremendous influence in its favor.

In 1789, when the Treasury Department w organized, President Washington appoint Hamilton the first Secretary of the Treasu and his handling of the nation's financial pr lems during his term of office laid the foun

tional prosperity. Through his ini- general government agreed to pay incurred by the states during the a; a national bank and mint were l; and national revenues were pro- by means of import duties (see nd taxes on certain home products. cial policy brought him into sharp ith Thomas Jefferson, who repre- e party opposed to a strongly-cen- overnment, and in 1795 he resigned up the practice of law in New York. n's influence did not decline with nent. He remained a trusted and ser of Washington, giving him valued a the trying Jay Treaty crisis, and tiring President he wrote the *Fare- ss.* In 1804 he became involved in a dispute with Aaron Burr and ac- e latter's challenge to a duel, in fell mortally wounded. On the t which has been erected over his old Trinity Churchyard, New York, to-day read this fitting tribute to ie patriot of incorruptible integrity; of approved valor; the statesman of te wisdom."

e Atherton, a modern American novel- eated Hamilton's life and character in best novels, *The Conqueror.* Consult, e's *Alexander Hamilton,* in "American Series."

Subjects. Knowledge of Alexander and of the crises which he was called eet may be considerably increased by the following articles in these vol-

Confedera-	Internal Revenue
	Jay Treaty
n	Political Parties in the
The	United States
Party	Washington, George

TON, the capital of the Bermuda The modern seat of government was rom Saint George's, the former cap- 315. Hamilton was incorporated in named for the governor, Henry Ham- was declared a city in 1898. It is n the coast of Hamilton Island and siness and tourist center of the col- ; the port of entry and departure of gular lines of steamers that ply be- ese islands and America, Canada, and the West Indies. Hamilton is as a "dazzling town of whitewashed with substantial stone wharfs and l streets." The population is about

e BERMUDA ISLANDS, for map.

HAMILTON, OHIO, the county seat of Butler County, situated in the southwestern part of the state, on both banks of the Great Miami River and on the Miami and Erie Canal (at present not in use). It is twenty-five miles north of Cincinnati and thirty-one miles southwest of Dayton, and is served by the Cincinnati, Hamilton & Dayton; the Pennsylvania; the Cincinnati, Indianapolis & Western, and the Grand Rapids & Indiana railroads. Interurban lines connect with Cincinnati, Dayton and Toledo. The area of the city exceeds five square miles. The population was 35,279 in 1910 and 40,496 in 1916, by Federal estimate.

Hamilton is attractively located in the Miami Valley, noted for fertility and wealth of vegetation. In the city are Ludlow, Sutherland, Benninghofen and River Front parks. A soldiers' and sailors' monument marks the site of Old Fort Hamilton. The prominent buildings are a county courthouse, costing $350,000; a Federal building, costing $110,000; a $250,000 Y. M. C. A. building; a $300,000 high school; Mercy Hospital, costing $150,000; and the Lane Free Library. At Oxford, twelve miles distant, are Miami University, Western College and Oxford College. In the city are more than 130 factories. One paper company, with an annual output valued at $6,000,000, employs over 1,500 men; a tool company, the largest of its kind, employs 1,300 men, and its annual production is valued at $3,000,000.

In 1791, General Arthur Saint Clair founded a fort on the present site of Hamilton as a base for his expedition against the Miami Indians. He named the place in honor of Alexander Hamilton. Two years later the fort was used by General Anthony Wayne in an expedition in which he succeeded in opening up the Northwest Territory to settlement. Hamilton was incorporated as a town in 1810, and in 1857 it received a city charter. It was the boyhood home of William Dean Howells, who wrote of it in *A Boy's Town.* Hamilton was one of the first American cities to own its water, gas and electric plants. C.R.G.

HAMILTON, ONTARIO, the county seat of Wentworth County, one of the most important manufacturing centers in Canada. It is situated on Burlington Bay, at the western extremity of Lake Ontario, thirty-nine miles southwest of Toronto, by rail. The Toronto, Hamilton & Buffalo, the Canadian Pacific and the Grand Trunk railroads and four electric lines connect the city with Dundas, Brant-

ford and other points. Steamers communicate regularly with other important lake ports. The first settlement was made in 1813 by George Hamilton, in honor of whom the place was named; it was incorporated as a city in 1846. The population of 81,879 in 1911 ranks it sixth among the cities of Canada; in 1916 it was estimated at 97,000.

Hamilton is a city of wide streets, attractive homes and substantial buildings. Of the last named the most notable are the courthouse, post office, armories, provincial asylum for the insane, some fine office and bank buildings and the Royal Hotel. Educational facilities are provided by an excellent system of elementary schools, a collegiate institute, a normal institute and a public library. Dundurn Park, containing the Wentworth Historical Society's Museum, is the largest and most attractive of the city's park reservations. Features of interest are the market place and a magnificent monument, erected on the site of the Battle of Stony Creek to commemorate the victory here gained over the American forces in June, 1813.

Through its fine shipping facilities, the abundant electrical power derived from Decew Falls, thirty-five miles southeast of the city, and the large supply of natural gas from the Welland field, Hamilton has won its rank as a manufacturing center. In the value of its manufactures it ranks third among Canadian cities, with a total which increased from $17,000,000 in 1900 to $55,000,000 in 1910 and to about $75,000,000 in 1916. There are about 400 industrial plants, the largest of which are the Canadian branches of the International Harvester, Westinghouse, International Steel and Oliver Plow companies. In the first three more than 8,000 people are employed. There are also factories for making cotton and woolen goods, clothing, glass, elevators, boots, tobacco products and a great variety of other manufactures. East of the city lies a large, rich agricultural section, highly productive of fruits and vegetables. The value of the agricultural produce exported annually from this district is estimated at about $1,000,000. H.M.M.

HAMILTON RIVER, the greatest river of the Labrador peninsula. Its source is a chain of small lakes, among them Ashuanipi and Atikonak, in the central part of the peninsula. From these lakes issue a number of small streams, which unite to form the Hamilton. About midway to the Atlantic in its course of 350 miles the river turns sharply, and instead of running southeast, it turns to the northeast, until it ends in Lake Melville, an extension of Hamilton Inlet.

Grand Falls. The Hamilton River is not important for its length or for the basin it drains (29,100 square miles). It is famous, however, for Grand Falls, which occur about 220 miles from the mouth. Here, within a distance of twelve miles, the river drops 760 feet, a series of rapids culminating in a sheer fall over a rocky ledge over 300 feet high. At the falls the river is 200 feet wide, and the roar of the waters can be heard for twenty miles. Below the falls the river rushes through a majestic cañon 400 to 500 feet high and about twenty-five miles long. The falls were first seen by white men in 1839, but in the course of half a century the existence became mythical, and not until 1891, when they were rediscovered, was accurate knowledge of them again obtained.

HAMLET, or **HAMLETH,** a personage, half mythological and half historical, whom Shakespeare has transformed into one of the most prominent figures in literature. He is the hero of the most famous tragedy of Shakespeare, which follows closely the semi-mythological story of Hamleth. According to the ancient legend Hamleth was Prince of Jutland; the king, his father, had been murdered by his own brother, Fengo, who took the throne. Hamleth pretended madness to save his life. His mother helped him avenge his father's murder by putting Fengo to death. The reader is referred to Shakespeare's *Hamlet*.

HAMLIN, HANNIBAL (1809-1891), an American statesman, one of the leaders of the antislavery faction for nearly two decades before the War of Secession. He was active in the organization of the Republican party in 1856, and was the first Vice-President of the United States elected by that party, for he was chosen on the Lincoln ticket in 1860. Hamlin was born in Maine. In 1835 he was admitted to the bar, and two years later began a long political career with election to the Maine legislature, as a Democrat. In 1843 he was sent to Congress, and served in the House of Representatives from 1843 to 1847. From the beginning of his Congressional term he took a firm stand against slavery, and in 1846 attracted wide attention by introducing into the House the famous Wilmot Proviso (which see), an antislavery measure.

Hamlin was elected to the United States Senate in 1848, to fill a vacancy, and was

ted for the full term in 1851. Five years he retired to become governor of Maine. 57, however, he returned to the Senate, he remained until his election to the Presidency in 1860. During the War of sion he gave Lincoln his cordial and unring support. From 1869 to 1881 he was sent to the United States Senate, and 1881 to 1883 was Minister to Spain.

MMER, THROWING THE, a feat of strength agility that forms an important part of rn athletic contests. The contestant s within a circle seven feet in diameter, ıfter swinging the hammer round his head in momentum, hurls it as far as possible. ıammer is a metal ball weighing not more sixteen pounds; the handle, not more than feet long, consists of chains or wire ropes wooden grips for the hands. Much prac- is required before one may become an

OSITIONS IN HAMMER THROWING
left, position of the feet at the beginning of wing; center, beginning of the second turn— up on the toes; at right, the balance, after g the hammer fly.

t. Strength is needed, but this is not so rtant as control of the muscles, which work in perfect harmony to produce the results. The record throw for a hammer ıing sixteen pounds is 172 feet.

M'MERFEST, a seaport belonging to ray, famous because it is the most northtown in the world. In giving this distinc- to Hammerfest, however, it must not be red that there are not more northerly ın habitations; there are a few small set- ents, without incorporated government, r to the North Pole. Hammerfest is sit- l on the island of Kvalö, near Tromso. summer temperature averages about 57°, that of the winter averages 31°; this ual mildness is due to the influence of the Stream. The town is built entirely of l, and has churches, schools, electric light, raph and other modern conveniences. sun does not set from May 13 to July nd this is the busy time of the towns- people. Fishing fleets are active, and cod-liver oil is secured in great quantities; salted fish, reindeer and fox skins, salt and coal are exported, and not only Norwegian vessels, but

WHERE DAYLIGHT LASTS FOR SEVENTY-TWO DAYS

those of other countries, especially Russia, engage in the city's trade. In this region there is not a great variety of food for animals, and cows and sheep have learned to eat fish. The sun is not seen from November 18 to January 23, and the quiet of winter prevails; but even then the fisheries are carried on to some extent, as there is a period of twilight daily. The town has a population of about 2,300.

HAMMOCK, *ham'uk,* a hanging bed or couch which to the sailor, accustomed to sleeping in it, is comfortable and luxurious, but to the uninitiated is neither pleasant nor especially safe. The natives of Peru first made use of such swinging beds, and it is from their word *hamaca* that the English name is derived. During the summer season hammocks of brightly colored, loose-woven cord or hemp are much in evidence on verandas or under trees, but the sailor's hammock is a less ornamental and more substantial affair. It is of heavy canvas three feet wide and six feet long, and is swung by cords at the ends to hooks under the deck. In the morning it is taken down, the mattress is rolled up in it, and the whole bundle is stored in a locker. Sometimes when a sailor dies at sea his body is wrapped in his hammock for burial, and it was of this custom that Tennyson was thinking when he wrote:

> O mother, praying God will save
> Thy sailor—while thy head is bow'd,
> His heavy-shotted hammock-shroud
> Drops in his vast and wandering grave.

HAMMOND, IND., an industrial suburb of Chicago, Ill., adjoining it on the southeast. It is situated in Lake County, in the extreme

northwestern corner of the state, and extends for two miles along the shore of Lake Michigan and for five miles down the Illinois-Indiana state line. The business center of Chicago is eighteen miles northwest. Through the city flows the Calumet River; this is navigable, and discharges into Lake Michigan at South Chicago, Ill., and also through the Indiana Harbor Canal. Hammond has the service of all the railway lines approaching Chicago from the east. Three interurban lines connect with Chicago, East Chicago, Gary, Whiting, Indiana Harbor and other cities in Northern Indiana. Shipping facilities are further increased by the operation of three belt lines. Hammond was settled in 1868 and was named in honor of Abram A. Hammond, acting governor of the state (1860-1861). In 1883 it was organized as a town, and in 1884 it received a city charter. The population in 1916 was 26,171, by Federal estimate; in 1910 the city had 21,101 people.

Although Hammond is closely connected with Chicago industrially, it is in itself a city of importance. There are five parks well distributed throughout the city, and a system of boulevards to connect these parks was in course of construction in 1917. Central Park contains the public library. Sessions of the Lake County Superior Court are held in Hammond, though it is not the county seat. This court was established by the state legislature to meet the needs of the growing city. The development of Hammond began with the establishment here of the G. H. Hammond Company's packing house. This firm was the first in the United States to pack fresh meat for shipment (1869). For a long time the town was known as a packing-house community, but attention has been turned to other branches of industry. At present the city has one of the largest manufactories of surgical instruments and one of the largest printing and publishing houses in the United States.

HAMP'DEN, JOHN (1594-1643), a British statesman who received the title of "Patriot Hampden" for resisting Charles I's demand for ship money, one form of taxation, after the judges had decided in favor of the king's right to levy. For this he was prosecuted in the Court of Exchequer and argued his own case against the Crown lawyers for twelve days before the twelve judges. Although the case was decided against him by a vote of seven to five, public opinion gave him the victory. Hampden was a member of the Short Parliament and the Long Parliament in 1640, and was one of the five members whom the king attempted to seize in January, 1642. When civil war broke out he commanded a regiment under the Earl of Essex in the Parliamentary army. In the skirmish on Chalgrove Field he received a wound and died six days later. See CHARLES, subhead *Charles I.*

HAMPTON, WADE (1818-1902), an American soldier, grandson of General Wade Hampton of the Revolutionary War, was born in Columbia, S. C. He was graduated from the University of South Carolina, studied law but never practiced it, and served in both houses of the state legislature. At the outbreak of the War of Secession he organized and equipped at his own expense a command of Confederate cavalry, infantry and artillery known as Hampton's Legion. He won distinction at Bull Run and Seven Pines, was made brigadier-general of cavalry, took part in Lee's northern advance and energetically opposed Sheridan's progress in the Shenandoah Valley. In 1864 he became lieutenant-general and assumed command of Lee's entire cavalry forces. In 1865, as commander of Johnston's cavalry, he made valiant efforts to prevent Sherman's advance northward from Savannah. From 1876 to 1879 he was governor of South Carolina, United States Senator from that state between 1879 and 1891, and United States Commissioner of Railroads from 1893 to 1897.

HAMP'TON COURT CONFERENCE, a meeting called in 1604 by James I of England to settle the differences between the Puritan and High Church parties of the Church of England. The conference lasted for three days and resulted in a few trifling changes in the ritual, but entirely failed to bring about the reforms desired by the Puritans. An important indirect result of the convocation was the revision of the Bible, called the King James, or authorized, version of 1611.

HAMPTON NORMAL AND AGRICULTURAL INSTITUTE, an undenominational, industrial school established at Hampton, Va., in 1868, for the education of negroes and Indians. Its influence on negro education has been noteworthy. From it was graduated Booker T. Washington, the greatest educator of the negro race, himself the founder of a similar institution (see TUSKEGEE NORMAL AND INDUSTRIAL INSTITUTE). Hampton Institute was opened in 1868 with two teachers and fifteen former slaves as students, under the auspices of the American Missionary Association. Its founder and first superintendent was General Samuel Chapman

rong. In 1870 it was granted a state char- The school is a private corporation, its gement being in the hands of a board of teen trustees, representing various reli- denominations.

r 1,000 acres of land are owned by the ıtion, and its 140 buildings include dormi- , recitation halls, the Collis P. Hunting- ibrary (containing 45,000 volumes), a ı, a Y. M. C. A. building, hospital, mod- ick barns and silos, a gymnasium, a trade , a community day school used as a prac- hool, and a hall for domestic science and lture. Carpentry, painting, blacksmith- ailoring and eleven other trades are open ys who are seventeen years of age and while the girls are instructed in house- laundry work, cooking, sewing, methods ching and the fundamentals of agriculture. nnection with a four-year agricultural , the institution maintains two well- ped farms, on which the best modern farm ce is observed.

expenses of the school, which are over 00 per annum, are met in part by con- ions. Students, however, are required to r their board, lodging, clothes, books and et their other personal expenses. Stu- receive wages ranging from six to nine an hour. Hampton believes in the moral of regular work under careful supervi- o all students must do a fair amount of ıl labor regardless of their ability to pay ills. The industrial departments are con- l throughout the year. Day classes for who desire academic, agriculture, business, economics and trade courses are open October to June. During the summer a l institute is carried on for over 400 col- eachers from over twenty states. About ys and girls also remain in summer to on the work on the farm, in the kitchens ormitories, in the trade-school shops and e roads and grounds. The school has a ng staff of over 200, and a student enroll- of 1,400, exclusive of those who attend mmer school. H.B.F.

MPTON ROADS, Battle of. See Moni- D Merrimac.

MPTON ROADS CONFERENCE, a fa- but fruitless conference in American his- n which an endeavor was made to arrange between the North and South toward the f the War of Secession. It was held on ary 3, 1865, on board the *River Queen,* at ton Roads (see Chesapeake Bay), near Fort Monroe. The conference was the result of the efforts of Francis P. Blair. President Lincoln and Secretary of State Seward represented the United States government. The Confederacy was represented by Vice-President Alexander H. Stephens, Senator Robert M. T. Hunter and Assistant Secretary of War John A. Campbell. President Lincoln refused to make any treaty with the Confederate government, and declined to consider any peace proposal other than immediate restoration of the Union, the laying down of Confederate arms and abolition of slavery. The conference adjourned after four hours of discussion.

HAMSTER, a species of rodent animals belonging to the same family as the mouse, and having the habit of undermining the ground like the gopher. The hamster is found in Central Asia and in a large portion of Europe. It is larger and stouter than the common rat, and has large cheek pouches and a short, hairy tail. On the underparts it is more or less black, the back is reddish-gray, and there are white spots on the sides and breast. This rodent burrows about three feet deep in dry soil, and constructs chambers with several entrances. Some of these rooms are large enough to hold considerable amounts of corn and seeds, carried by the animal in its cheek pouches. During the winter it sleeps most of the time in its burrow, but wakens about February to feed on its previously gathered store. It is very prolific, and two or three broods, each consisting of about twelve, are born in a year. The hamster is partly kept in check by dogs and foxes, which kill and feed upon it, but in Belgium it became such a pest that the government at one time offered a bounty for each animal killed.

HAMSTER
About one-tenth actual size.

HANCOCK, John (1737-1793), one of the most famous of American patriots of Revolutionary fame, President of the Continental Congress from 1775 to 1777, the first signer of the Declaration of Independence and the first governor of the state of Massachusetts. From the circumstance of his having been the first to sign the Declaration, the expression, "to place one's John Hancock on a paper," meaning, "to sign one's name," has become a part of current speech. He was born in Braintree, Mass., and educated at Harvard College. From

the beginning of the struggle of the colonies against British tyranny he took a leading part in defense of American rights, both with voice and pen, and the attempt of Governor Gage to arrest Hancock and Samuel Adams on a charge of treason was one of the causes of the Battle of Lexington (see LEXINGTON, BATTLE OF). During the Revolution, as major-general of Massachusetts militia, he led the state troops in the Rhode Island expedition of 1778. He served as governor of Massachusetts from 1780 until his death, except in 1785-1786, when he was again a member of the Continental Congress. An excellent portrait of Hancock, painted by John Singleton Copley, hangs in the Boston Museum of Fine Arts.

JOHN HANCOCK

HANCOCK, MICH., a city in Houghton County, named for John Hancock of Revolutionary fame, and noted for its copper industry. It is situated in the extreme northern part of the Upper Peninsula, on Portage Lake. Houghton, on the opposite shore, is connected by bridge and an electric line with Hancock; Marquette is ninety-seven miles southeast and Calumet is twelve miles north. The city is served by the Chicago & North Western; Chicago, Milwaukee & Saint Paul; Duluth, South Shore & Atlantic; Copper Range, and the Mineral Range railways and an electric line. A ship canal provides a short cut for lake traffic to and from Duluth. The first settlement was made in 1840; it was incorporated as a village in 1863 and as a city in 1903. Finns comprise sixty per cent of the population, which increased from 8,981 in 1910 to 12,079 in 1916, by Federal estimate.

Hancock is located in the center of the famous copper region of Lake Superior, and the mining, working and shipping of copper ore is the principal industry. The Quincy, Calumet and Hecla mines are in this locality. There are large smelting works, foundries, saw and planing mills and factories for making miners' clothing, bed springs and boxes. Features of interest in the city are Montezuma Park, Suomi College, the only Finnish College in the United States, and a city library.

HANCOCK, WINFIELD SCOTT (1824-1886), an American general in the War of Secession and in 1880 an unsuccessful candidate for the Presidency of the United States. He was born at Montgomery Square, Pa., was graduated at West Point in 1844 and appointed second lieutenant in the Sixth Infantry. He fought in the Mexican War, where he commanded a company, earning the brevet of first lieutenant for services at Churubusco. From 1859 to 1861 he was chief quartermaster of the Southern California district. At the beginning of the War of Secession he was given a command in the Army of the Potomac and distinguished himself at Williamsburg, Va., where General McClellan said in his dispatches that "Hancock was superb." On December 13, 1862, his command suffered a heavy loss at the Battle of Fredericksburg, but he saved the day largely at the Battle of Chancellorsville. He was wounded at Gettysburg, where he took direct command until the arrival of Meade. In 1867 he was sent to New Orleans to supervise the work of reconstruction in Texas and Louisiana, but was relieved at his own request and assigned to the Atlantic military division on Governors' Island New York. He was nominated for President of the United States on the Democratic ticket in 1880, but was defeated by Garfield.

General Hancock was a brilliant leader and forceful speaker. In a speech on the tariff which was the chief political issue in the campaign of 1880, he uttered a statement that amazed his opponents when he said, "The tariff is a local issue." It was termed absurd and foolish, yet time has shown it to be true.

HAND, a wonderfully-useful part of the human body, through which man performs countless varied and intricate acts. It has often been said that with the heart man conceives with the head he directs, and with the hand he executes. The bony framework of the hand admirably fits it for the important part it plays in human activity. There are twenty-seven hand bones. The wrist, which joins the hand to the forearm, contains eight *carpal* bones; there are five long *metacarpal* bones, which lie in the palm. Fourteen slender *phalanges* are found in the fingers and thumb, three in each finger and two in the thumbs.

Beginning in the upper part of the forearm are muscles which pass to the bones of the hand and near the wrist unite with strong, slender cords called *tendons*. These tendons are

d to the joints of the fingers and When the muscles are excited to action t a pull on the tendons, which in turn he parts to which they are attached.

THE HAND

Phalanges; (*b*) metacarpals; (*c*) car-) radius; (*e*) ulna.
te lines indicate extensor muscles. The uscles, the opposite set, occur in the

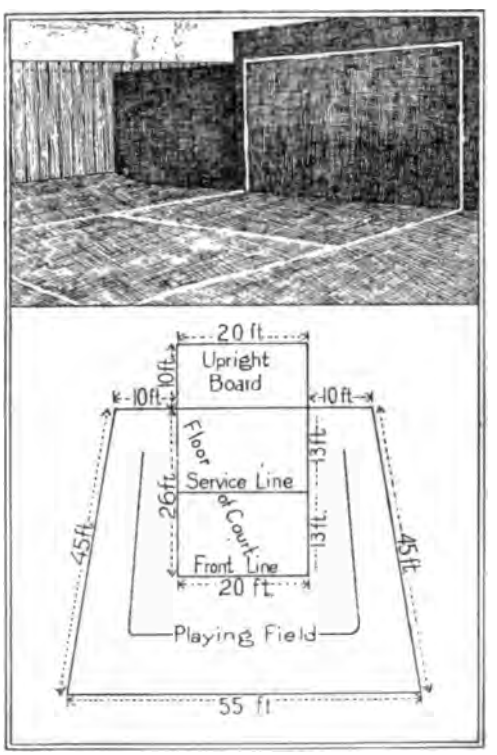
ers can be straightened out or moved ved into various positions, and the an be made to meet every part of the the fingers and can touch them at sev- es on the back. If it were not for this f the thumb it would be difficult to and handle objects, so in treating an and the surgeon does everything in his save the thumb.

parison of the structure of the hand shows that the bones of the hand are ily moved than those of the foot, and latter are the stronger and heavier. n of the hand, which corresponds to r side of the instep, is nearly flat, while p is arched. The hand is designed for ation, the foot for supporting the f the body and to help in walking. The s one more bone in its skeleton than . See FOOT. S.C.B.

BALL, AMERICAN, a spirited game ith an elastic ball which is struck with ed hand against a board or wall. Hand- developed from an old Irish game our-wall handball, but it has been so and improved that in its present form more scientific than the older sport. ly it is played in "singles" or "doubles," by two or four players, but it can be for three persons as well. A good ust use his left hand skilfully.

The Court. A special court is required, consisting of a *floor,* usually of smooth concrete or unglazed gymnasium boarding, a surrounding *field,* and an upright *board* braced so as not to "give" or vibrate. This board serves as the rear wall. Court and field boundary lines are marked in red, the *service line* being drawn midway between the front line and the board. The accompanying diagram outlines a correctly-planned court.

How It Is Played. *The Serve:* The player who begins the game—*the server*—stands within the outer section of the court. Until the ball is put in play the other players must stand outside the court, in the field. The server serves the ball by dropping it to the floor anywhere within the court on that side of the service line farthest from the board. On the first rebound he strikes it so that it flies against the board and rebounds. A proper serve requires that after leaving the board the ball



HANDBALL COURT

shall first touch the floor within the section farthest from the board. If a served ball leaving the board first touches the floor on the side of the service line nearest the board it is called *short;* if it falls on that side of the front

line farthest from the board it is called *long*. If one long and one short or two long or two short balls are served consecutively by the same server the server is out; in doubles the side is out. Also, if a served ball touches the floor outside the side lines of the court the server or side is out.

The Return: Let us assume that the ball has been properly served. The opponent *returns* it by striking it against the board and he may make this play either from a "fly" ball or after the first bounce. If he succeeds, the server bounds it again from the board and the game proceeds. If he fails, the server scores one point, the inning is closed and the same server opens the next inning.

Twenty-one points constitute a game. *Scoring shots* can be made only by the serving side; *putouts* are made by the opposition. A ball striking a player on its way from the board counts against the side struck and scores a point or a putout for the opposition. If on its course *toward* the board it strikes an opposition player before touching the floor, it is called a *hinder,* and two hinders on one service constitute a point or a putout against the playing side. A returned ball landing outside the court means a point or a putout against the playing side. Under certain restrictions a player may *block* his opponent by changing position so as to prevent free access to the ball. For complete directions and official rules, consult pamphlets on handball which are obtainable from any athletic or stationery store for ten cents.

Its Popularity. Handball is growing steadily in popularity, both among professional athletes and those seeking recreation in sports. It is considered one of the best forms of preliminary athletic training, because it educates the eye in judging distance and direction, calls into play a great number of muscles, improves bodily control, increases the ability to make quick starts and stops, and develops the habit of instant decision.

On account of the limited area needed for its court, handball is peculiarly adapted to large cities, where large spaces are seldom available. In many cases courts have been built on the roofs of office buildings, enabling business men to take advantage of this stimulating exercise out-of-doors with but little interruption to their work. W.C.

Consult Egan's *Hand Ball,* one of the volumes included in "Spalding's Athletic Library."

HAN'DEL, GEORGE FREDERICK (1685-1759), a musician and composer, whose oratorios rank his among the greatest names in the history of music. *The Messiah* is one of the immortal masterpieces of music. Handel was born at Halle, in Saxony, Germany, and at the age of twelve made his debut as a performer at the court of Berlin. Later he played in orchestras at Hanover and Hamburg, and his first two operas, *Almira* and *Nero,* were performed in the latter city.

GEORGE F. HANDEL
His oratorios have made his fame imperishable.

In 1706 he left for Italy to study, where he remained three years. It was during this time that Handel's Italian style reached its full maturity and that his name became widely known throughout the musical world. Then he went to England, where he remained the greater part of his life. But it was not until after his appointment as head of the Royal Academy of Music that he changed from opera to the composition of oratorios, and produced in succession *Israel in Egypt, L'Allegro and Il Penseroso, Saul, Samson,* and many other English oratorios.

He composed forty-two operas before writing *The Messiah,* which was brought out in 1741 for the benefit of the Foundling Hospital in Dublin. It is said that at this performance when the great "Hallelujah Chorus" was reached, King George II, moved by pious emotion, rose to his feet, which action was promptly followed by everyone in the house. To this day it is the custom in some places to rise when this chorus is being sung. No choral festival is considered complete without some reminder of *The Messiah.* It continues as the most popular of all oratorios in America and England, combining the elements of beauty and popularity. Handel worked almost to the day of his death, for not even his blindness, during his last six years, could daunt his energy. He was buried in Westminster Abbey.

Consult Marshall's *Handel,* in "Great Musicians Series."

HANDICAP, *han'di kap,* an extra burden or penalty placed on a competitor in athletic events, who by past performances has proved himself superior to those with whom he matches his skill. The name is derived from the drawing of lots from a cap. The object of the

place all contestants on an equal
es the best athletes start from a
"scratch." In front of them, at
ing according to "form" previ-
are placed those other runners
he benefit of handicaps. In all
ortance an official handicapper is
his decision as to what form the
take is final. Horses are handi-
es by being made to carry extra
rs are handicapped by strokes
ents. In the great national games
d cricket there are no handicaps,
of these sports makes it impos-

AN, a musical instrument having
strings and shaped somewhat like
ibration of the strings is produced
wheel which is treated with rosin
by a handle at the end. The
pplied to the *hurdy-gurdy,* which
instrument having a harsh tone,
dingly limited artistic field, and
ose surface contains pegs which
s and produce tone effects. The
s known to have existed in the
, and was in vogue for a time in
ury; but the present hurdy-gurdy
ed to street musicians, who fre-
t it on wheels, for greater ease in
. It is not a popular instrument,
in derision *barrel organ,* because
r.

. Because of the peculiar forma-
t, this name is given to the Bal-
(see ORIOLE).

V, *hahng'chow,* an ancient walled
capital of the province of Cheki-
ected with Peking by the Grand
100 miles southwest of Shanghai,
the East China Sea. Hangchow
nter of Chinese learning for cen-
is now one of the most important
ities of the East. Walls twenty
thick and forty feet high sur-
cient portion of the city and are
en well-guarded gateways. The
on consists of beautiful suburbs
alls. Hangchow was opened to
in 1896, having previously held
ommunication with "foreign dev-
eans are there called. Now the
ods to the value of more than $10,-
lly and the imports are valued at
00. The exports consist of tea,
s, gold and silver ornaments, tap-
estries and furs; the imports are chiefly manufactured goods, copper, leather and tobacco. Population, including suburbs, estimated at about 600,000. The city is also known as Hang-Chow-Fu.

HANG'ING, the legal method most generally adopted for the infliction of the death penalty upon those convicted of murder. The present system of hanging, by use of the drop, was first used in 1760. For a long time it was considered necessary to have both executions and trials public in order to impress evildoers; but the tendency is now to avoid publicity, and the sentence is carried out within prison walls, with but few witnesses. The place and time are also fixed within statutory limits by the sentence of the court, which orders that between specified hours on a certain day the condemned shall "be hanged by the neck until dead." In some states of the Union, electrocution has been substituted for hanging. Courts have very generally adopted Friday (which see) as the day of the week for executions. See CAPITAL PUNISHMENT; ELECTROCUTION.

HANGING GARDENS OF BABYLON, THE, regarded as one of the seven wonders of the ancient world, were situated at Babylon. According to accepted belief they were constructed by King Nebuchadnezzar as a pleasure resort

A VIEW OF THE HANGING GARDENS

Drawn from a painting which was supposed fairly to represent their magnificence.

for his Median wife, Amytis, whom he had brought from a mountainous region and who had wearied of the level plains of her adopted country. The enclosure contained several acres of flower gardens, groves and avenues of trees, with fountains and banquet-rooms distributed at intervals. The entire area was raised in terraces by means of tiers of masonry to heights of from seventy-five to 300 feet. Water for irrigating purposes was pumped from the Euphrates River by a device said to resemble the screw of Archimedes (see ARCHIMEDEAN SCREW).

Some authorities attribute the construction of the hanging gardens to Semiramis, a semi-historic queen of Assyria. See SEVEN WONDERS OF THE WORLD.

HANKOW, *hahn'kou,* the most important commercial city in the interior of China, 600 miles from the sea, in the province of Hupeh. It is situated at the junction of the rivers Han and Yang-tse-kiang, in a network of navigable rivers and lakes, and is connected by railroad with Peking. Hankow is one of China's treaty ports; it was opened to foreign trade in 1862 by the British, who had previously held exclusive commercial concessions. The native quarters of the city are dirty and overcrowded, but the European "concessions," as they are called, extend for more than three miles along the river banks, with substantial residences and business buildings. The largest ocean-going steamers ascend the Yang-tse-kiang and unload into lighters moored in the river, which is here nearly a mile wide. The principal exports are tea, hides, cotton, silk, rice and oils. The imports are piece goods, metals and machinery. In 1912 Hankow was captured by the Chinese revolutionists and made the provisional capital of the new republic. Population, 826,000.

HAN'NA, MARCUS ALONZO (1837-1904), an American capitalist, political leader and former Senator of the United States. From the beginning of his career as a business man and throughout his political activity, Hanna showed remarkable initiative and energy. He was born in Ohio and educated in the Cleveland public schools. In 1858 he entered the wholesale grocery business in Cleveland, gradually extended his interests, and in 1885 was head of a large coal and mining firm. Later he acquired stock in newspapers, theatrical enterprises, banks and railways.

As early as 1880 Hanna had become active in local Republican politics, and his influence steadily increased. At the time during which he was the greatest single force in the Republican party he was by many Republicans, and by those of all other parties, one of the most cordially disliked men in the nation. After the election of McKinley he was appointed United States Senator from Ohio to fill the unexpired term of John Sherman, whom the President had made Secretary of State, and in 1896 he was elected for the following full term. Hanna was actively interested in questions pertaining to capital and labor, and in 1902 used his influence to bring about a settlement of the anthracite coal strike.

HAN'NAY, JAMES (1842-1910), a Canadian historian, remembered chiefly for his *History of Acadia,* a work which dispelled much of the sentimental haze created by Longfellow's *Evangeline,* and considerably modified the previous notions of English cruelty in dealing with the Acadian peasants. Of his numerous other writings the most important are *History of the War of 1812,* biographies of Wilmot and Tilley, and a *History of New Brunswick.* Hannay was born at Richibucto, N. B., studied law, was called to the bar in 1867, and was for six years official reporter of the provincial supreme court. He was afterwards engaged in newspaper work, and through his editorials in the Saint John *Gazette* and the *Telegraph* wielded considerable influence. He lectured frequently on historical topics, and also contributed historical articles and occasional poems to periodicals.

HAN'NIBAL (247-183 B. C.), the greatest general and statesman of ancient Carthage, who in the use of stratagems and ambuscades surpassed all other military leaders of antiquity. He was destined by his father, Hamilcar Barca, to succeed him in the work of vengeance against the Romans, who had constantly sought to bring North Africa under subjection. While still a boy he was taken to Spain, where he showed marked evidence of his military aptitude. At the age of twenty-five he became commander of the army in Spain. Judging that the Romans could be conquered only in Italy, he prepared to carry out his vengeance against Rome by marching across the Pyrenees, the Rhone and the Alps with 90,000 foot soldiers, 12,000 horsemen and thirty-seven elephants. He reached the Rhone before the Romans could check his advance, after great hardships in crossing the mountains and a consequent depletion of his forces. His passage over the mountains was one of the greatest achievements of any military force of antiquity. He encountered a Roman army under Scipio on the banks of the Ticino and defeated it in 218 B. C., chiefly by the strength of his Numidian cavalry.

The following year Hannibal defeated the Roman general Flaminius, then marched into Apulia. In 216 B. C. the battle of Cannae was fought, which resulted in a total defeat for the Romans, about 50,000 of whom were killed. Hannibal then made his new headquarters in Capua, where his troops lived so luxuriously that their discipline and health were undermined. In the next two years Hannibal's posi-

Southern Italy became difficult; his uffered reverses, and neither his own nent nor Philip V of Macedon, his r, helped to recover his losses. In 212 ured Tarentum, but lost his hold on ia. In 203 he was called to defend his , which had been invaded by Scipio. defeated in Africa by the Romans in . at Zama, and after eighteen years of conflict, the Second Punic War ended, e being forced to accept the most ting conditions of peace. Hannibal was rty-six years of age.

being concluded, he proved himself an tesman, and as civil magistrate devoted to restoring the resources of Carthage. years after the victory at Zama the Romans sent ambassadors to demand ender. He fled to Ephesus and offered ices to Antiochus III of Syria for the en commencing against the Romans. ere accepted, but failing in an expedi- ainst the Rhodians as commander of ian fleet, Hannibal was obliged to flee. it to Crete, then back to Asia and refuge with the king of Bithynia. The sent Flaminius to demand his sur- but Hannibal preferred to die rather delivered into the hands of his ene- At Libyssa he took poison, which he carried with him, secreted in a ring. obable year of his death was 183 B. C.

lt Abbott's *Hannibal the Carthaginian; Hannibal.*

ed Subjects. The following topics in olumes may be consulted in connection e article on Hannibal:

e	Punic Wars
ar Barca	Scipio

NIBAL, Mo., a growing industrial city Mississippi River, eighteen miles south ncy, Ill., 120 miles northwest of Saint nd about ninety miles west of Spring- ll. It is in Marion County, in the stern part of the state, and is served Missouri, Kansas & Texas; the Wabash; icago, Burlington & Quincy; the Saint t Hannibal, and other railroads. By at lines it has water connection with ver towns. The population was 18,341 and 21,836 in 1916, by Federal esti-

manufacturing section of the city occu- low land close to the river; the busi- nd residence sections extend west on and hilly ground. Among the promi- nent buildings are a city hall, erected at a cost of $100,000; a Federal building, costing $175,000; a Y. M. C. A. building, Garth Memorial Library, the County courthouse, Levering Hospital and Nurses' Home, Saint Elizabeth's Hospital and the high school. A large railroad and wagon bridge crosses the river to East Hannibal, Ill. Central Park is a city park of one acre; Riverview Park, containing 120 acres, extends along the river to the north.

Of the numerous articles manufactured at Hannibal, the most important are cement (produced by one of the largest Portland cement plants in the Middle West), shoes, stoves, car wheels, furniture, cigars, buttons and foundry and machine-shop products. The value of manufactured products in favorable years exceeds $8,500,000.

During a part of his boyhood, Mark Twain lived at Hannibal, and his old home is owned and kept by the city as a memorial. The city contains also a monument to him, erected by the state. Here he lived the life of a "river rat" and with his imaginative companions experienced many of the incidents described in *Huckleberry Finn* and *Tom Sawyer*. Their cave south of the city is visited by many people.

Hannibal was laid out as a town in 1819 and incorporated in 1839. The government is administered under a city charter, granted in 1845 and revised in 1873. Prior to 1890 the city was an important lumber market.

HANOI, *hah noi'*, one of the most important cities of Annam, Southeastern Asia, capital of the province of Tongking, and the seat of the government of French Indo-China. It has a picturesque situation on the Songkoi, or Red River, eighty miles from its mouth in the Gulf of Tongking. The Songkoi River is navigable for small vessels and is crossed at Hanoi by a fine railway bridge over a mile in length. The city is connected with its port, Haiphong, by a railroad, and is also in communication by rail with Langson, a town on the Chinese frontier. As a commercial center it is of considerable importance, though most of the trade is in the hands of Chinese merchants. Rice, silk, cotton embroidery and matches are exported, and the natives produce beautifully-carved furniture and artistic metal work. The city has been greatly improved since it came into the possession of the French in 1882. New broad streets have been constructed, some well lighted with electricity, and even the native quarters are clean and well kept.

The population, consisting chiefly of Annamites, Chinese, Japanese and Indians, with about 3,000 Europeans, is estimated at 110,000.

HANOVER, *han'oh ver,* a town in Grey County, Ontario, in the western part of the Ontario peninsula. It is on the Saugeen River and the Grand Trunk and Canadian Pacific railways, forty-five miles by rail south of Owen Sound. Hanover is an important furniture manufacturing center, having no fewer than eight furniture factories. There are also flour and woolen mills, a shirt factory and brick and cement works. The town receives hydro-electric power from Eugenia Falls. Population in 1911, 2,342; in 1916, estimated, 3,000.

HANOVER, in German, *hahn o'ver,* since 1866 a province of Prussia, but formerly an independent kingdom, which gave to England a line of Hanoverian rulers. The province is bounded on the north by the North Sea,

LOCATION MAP
The province is shown in black.

Schleswig-Holstein and Mecklenburg-Schwerin, west by Holland, east by Saxony and Brunswick and south by Hesse-Nassau and Westphalia. It is drained by the rivers Elbe, Weser and Ems, with their numerous tributaries. The southern part is mountainous, containing the Harz Mountains, which are extremely rich in minerals and timber. Agriculture is the most important industry, but is in a backward state, only forty per cent of the available land being cultivated. The soil is not very fertile, except in some low-lying districts, but hops, flax, tobacco and sugar beets are grown. The manufactures are extensive, especially those of iron and copper, cotton and woolen goods and leather. Shipbuilding is an important industry, carried on chiefly at Wilhelmshaven, the principal base for submarine vessels during the War of the Nations. Although there are excellent railroad communications, the River Weser is the main commercial highway of the province.

For administrative purposes the province is divided into six departments, Hanover, Hildesheim, Lüneburg, Stade, Osnabrück and Aurich. Until 1692, when it was made an electorate, Hanover was practically a part of the Duchy of Brunswick. In 1714 the Elector George Louis became King George I of England, and, until 1837, Hanover was ruled by English sovereigns. Hanoverian laws did not permit a woman to ascend the throne, so when Victoria became queen of England in 1837, Ernest Augustus, duke of Cumberland, fifth son of George III of England, became ruler of Hanover. The incorporation of Hanover as a part of the Prussian empire by the terms of the Peace of Prague in 1866 was bitterly opposed by the king of Hanover. Enmity between the Hohenzollerns of Prussia and the Guelphs of Hanover existed until the reconciliation effected by the marriage of the daughter of Kaiser William II to Ernest Augustus, son of the last king of Hanover.

Hanover, a flourishing manufacturing town, is capital of the province of Hanover. It has iron foundries, machine works and manufactures of chemicals, tobacco and cigars. The River Leine flows through the city, dividing it into an old and a new portion. As an educational center Hanover ranks high among German cities and is noted for the purity of the German spoken there. Its commercial growth is modern, but has been so rapid that within a few years it has become the seventh city of Prussia and twelfth in importance in the German empire. Hanover was the first German city to be lighted with gas. The city was founded in 1100, and was an important member of the Hanseatic League in 1481. Population in 1910, 302,375. F.ST.A.

HANSEATIC, *han se at'ik,* **LEAGUE,** or **HANSA,** a union of a number of cities of Northern Germany, formed in about the thirteenth century for their mutual safety and the protection of their commerce. The sea and land were so overrun with pirates and robbers that Hamburg and Lübeck made a compact to keep open the road across Holstein connecting the North Sea with the Baltic, Brunswick soon joined these cities, and out of this union grew the Hansa, which at its most flourishing period included eighty-five towns and cities.

Lübeck was recognized as the leader, and here deputies of the other Hanseatic towns

discuss their affairs. During the fifcentury the power of the league was at ght, but as its power and ambition inpeople dreaded its domineering au-. However, it was of great benefit to rn Europe by establishing new centers e, constructing canals and introducing rm system of weights and measures, itate commerce. After the discovery of a the trade of Europe was entirely re-d, so the Hansa declined rapidly and f its members withdrew. Only Hamübeck and Bremen remained faithful old compact, and under the new Germpire they still retain their self-govt, being known as Hansestädte. See TATES.

'GOOD, NORMAN (1868-), an Amerlitor and author who in his writings ; untouched few topics of public interor is his range of subjects more notethan the force and directness with he has presented them. No one, readeditorials, could remain in doubt as to victions. He was born in Chicago, but last for his education, graduating from d University and Harvard Law School. st work was done as a dramatic critic staff of the *Commercial Advertiser* of ork, and afterward he was one of the of the *Bookman;* his writings in the ublication attracted so much attention 1903 he was made editor of *Collier's* . This post he held for ten years, reing it in 1913 to become editor of *s Weekly,* with which paper he reuntil 1916, when it was combined with *dependent.* Hapgood then gave his atentirely to political affairs.

SBURG, *hahps'boorK,* or **HABSBURG, OR,** an imperial family, famous in Euroistory, a descendant of which wears to- crown of Austria-Hungary. The name, action of *Habichtsburg,* meaning *hawk's* is taken from a castle which was built eleventh century by Werner, Bishop of urg, on the bank of the Aar River, in ss canton of Aargau. His nephew, I, was the first Count of Hapsburg, real founder of the imperial house was III, who lived during the latter half twelfth century.

1438 until 1806, when the title became all but two of the sovereigns who e crown of the Holy Roman Emperor Iapsburgs (see HOLY ROMAN EMPIRE). Emperor Charles V (1500-1558) founded a Spanish line of the Hapsburg family, which became extinct in 1700. The male line of the Austrian Hapsburgs died out in 1740, but Maria Theresa (which see), daughter of Charles VI, succeeded to the throne, and her descendants have continued to rule in Austria.

HARA-KIRI, *hah'rah ke're,* a Japanese method of suicide, formerly permitted among criminals of the Samurai, or military class, as being less disgraceful than public execution. It consisted of disembowelment by means of gashes made in the abdomen in the form of a cross. This manner of death was also employed by those who wished to avoid the consequences of criminal or dishonorable acts. Since 1868, when the Japanese feudal system was abolished, hara-kiri has fallen almost entirely into disuse, but it is occasionally practiced. The last prominent people to commit hara-kiri were Baron Nogi and his wife, in 1912, because they did not wish to live after their beloved emperor, Mutsuhito, died.

HAR'COURT, SIR WILLIAM GEORGE GRANVILLE VENABLES VERNON (1827-1904), an English statesman and one of the most devoted followers of W. E. Gladstone during the latter's notable career. He was graduated with honors from Cambridge, was called to the bar in 1854, and was appointed professor of international law at Cambridge in 1869. He first attracted attention by a series of letters to *The Times* of London, in which he strongly opposed the recognition of the Southern states of America as belligerents in the War of Secession. Entering Parliament in 1868, he soon achieved a reputation as a ready debater, with great power of satire. He became Home Secretary in 1880, and in 1886 was made Chancellor of the Exchequer. He was a bitter opponent of the British policy that led to the South African War (1899-1902), and his toocandid criticisms caused him to lose much of his popularity. The party he had led for many years adopted Lord Rosebery as chief, and Harcourt remained in Parliament merely as a private member. He was typical of the advanced liberal politician of his time, a true aristocrat, yet a master of the art of conducting a popular campaign.

HARDECANUTE, *hahr de ka nute',* or **HARTHACNUT** (about 1019-1042), one of three successive Danish kings who ruled England and Denmark. He was the son of Canute the Great, whose courtiers wishing to flatter him asked that he "command the waves of

the sea to stop." Hardecanute's mother was Emma of Normandy. At the time of his father's death in 1035 he was ruling as underking in Denmark, and his half-brother Harold at once laid claim to the throne. His claims were supported by his mother and Godwin, Earl of the West Saxons, who succeeded in holding Wessex, while Northumberland and Mercia were held by Harold. Hardecanute, however, made no effort to secure his part of the kingdom, and it passed also to Harold. The latter died in 1040. The Witan, or council members, then chose Hardecanute king, and he reached England with sixty ships and began at once to extort a large sum for their maintenance. His reign was not marked by war or other important events, the government being left in the hands of his mother and Earl Godwin, while he gave himself up to coarse pleasures. After his death he was succeeded by his half-brother, later known as Edward the Confessor, who built Westminster Abbey.

HARDNESS. In a solid substance, such as copper, glass or steel, hardness is determined by its ability to scratch or to resist being scratched by other substances. One body is harder than another when it will scratch or indent it; for instance, glass will scratch copper, so it is the harder of the two. When many solid substances, such as iron and steel, are heated to a very high temperature and suddenly cooled they become much harder, but some substances, such as copper, if treated in this manner, become soft and pliable, so they are slowly cooled to harden (see TEMPERING; ANNEALING). Gold and silver are too soft to use as coins when pure, but are made hard by mixing with copper (see ALLOY). The hardness of any given substance is generally measured from a table of a few well-known minerals ranging from the soft talc, which is easily scratched by the finger nail, to the diamond, the hardest known substance. This standard "scale of hardness," beginning with the soft minerals, is as follows:

1. Talc	6. Feldspar
2. Gypsum	7. Quartz
3. Calcite	8. Topaz
4. Fluorspar	9. Sapphire
5. Apatite	10. Diamond

Numbers 1 and 2 can be scratched by the finger nail; numbers 3 to 6, inclusive, can be scratched by a knife, and number 6 will scratch ordinary window glass. Number 10 can be ground or polished only by diamond powder.

HARDY, ARTHUR STURGIS (1837-1899), a Canadian barrister and statesman, for many years one of Sir Oliver Mowat's chief lieutenants in Ontario, and for the last three years of his life premier of the province. Hardy was born at Mount Pleasant (or Mohawk), Brant County, Ont., attended the grammar school there, and after further studies was admitted to legal practice as an attorney in 1861, though he was not regularly called to the bar until 1865. His youthful enthusiasm, his attention to detail, a pleasing presence, which conciliated juries, and, above all, his capacity for hard work, all combined to win him rapid advancement. He was created Queen's Counsel in 1876.

Hardy's success as a barrister naturally turned his thoughts towards a political career, but he was wisely restrained from entering politics until 1873, when he felt that his professional standing was assured. He was elected as a Liberal member of the Ontario legislature, in which he sat until his death. In 1877 Sir Oliver Mowat appointed him provincial secretary, and in 1889 commissioner of crown lands. In 1896 Hardy succeeded Mowat as premier. He was an active legislator, and secured the adoption of many needed laws on sanitation, liquor licenses, legal procedure, railways and other matters of general interest. Though his administration was brief, it was important in Ontario's history. G.H.L.

HARDY, THOMAS (1840-), an English novelist whose stern types of character will probably live in literature in spite of the fact that they are too tragic and cruel to appeal to many readers. He was born in Dorsetshire, studied at King's College, London, and early began training to become an architect. When he was twenty-seven he left that profession to begin writing, and his *Far from the Madding Crowd* first gained him popular favor. In 1878 he produced *The Return of the Native,* which some regard as his masterpiece. *The Woodlanders,* written in 1887 was followed four years later by *Tess of the D'Urbervilles,* through which Hardy

THOMAS HARDY

most widely known. None of his sto-
ds the reader's interest more closely
e a stronger appeal to the sympathies
s tragedy of Tess. *Life's Little Ironies,*
and *Jude the Obscure,* in 1895, show his
, fatalistic view of life; he regards men
ess victims of uncontrollable circum-
In 1910 he was given the Order of
Two years later his writings were pub-
ı a twenty-volume set.

', a little gnawing, four-legged animal,
ble for its keenness of sight and hear-
for its extraordinary fleetness. Hares
ıd in nearly all parts of the world, but
ica they have been commonly, though

THE HARE

ıly, called rabbits (see RABBIT). The
ed, long-legged *jack rabbit* of West-
ns and prairies, and the common little
il, found throughout America, are
ares. Rabbits were originally Euro-
imals only, but they have been intro-
ıto other countries. They are smaller
es, with shorter limbs and ears. They
as quick as their larger relatives,
escape their enemies, they need only
ıeir burrows. Hares do not burrow.
ıng of rabbits, unlike those of hares,
ı blind and almost hairless. The *Bel-*
e is really a large rabbit.

range from seventeen to twenty-five
ı length. They have soft fur, usually
brown, although that of some species
ıite in winter. Their tails are short,
ıd upturned. When hares literally fly
ıe ground in great leaps and bounds,
:h the long hind legs are especially
is plainly seen that the under tail is
Black markings show on the lifted ears.
he animal squats on the ground it
e its surroundings that were it not for
:hing, and for its quivering whiskers,
l ofttimes not be discovered, so well
ɔecome a part of nature's color scheme.
pper lip of the hare is split, and the
ıd lips of the young especially seem
always aquiver. Their fore feet have five toes, and the hind feet have four. Those hind feet are capable of striking quite hard blows if the animal is driven to bay. The soles of the feet are hairy. The fore feet of the animal cannot be used for carrying food to the mouth, as can those of the squirrel. Hares feed on vegetable matter only, and they are especially fond of cabbage, grain and the bark of trees. They feed and roam about mostly at night, returning at break of day to their hollows, or *forms,* in the grass or near a sheltered rock. During nightly foraging expeditions much havoc is often wrought in grain fields, vegetable gardens and plantations.

Hares multiply rapidly, mating when six months old and producing two and three broods yearly, with from two to five young in each brood. At the end of a month or two young hares leave their parents and shift for themselves. So in sections where civilization has killed off the natural enemies of these rapidly-multiplying creatures, such as the coyotes, foxes, weasels, eagles, hawks, etc., men must devise means to save their crops from the hare family. In many places rabbit-proof fences have been erected, but the animals, where they have become a serious menace to agriculture, are much hunted, especially in Australia, not only with snares, dogs and guns, but by periodical drives. All the men and boys, and sometimes women and girls, of a district circle about a space of a square mile or so and drive the hares from their hiding places into an enclosure. There they are beaten to death with clubs, often as many as 20,000 having been disposed of in this way in a day. The month of March is the principal breeding time of hares, and the crazy antics through which they go at that time suggested the much used phrase *as mad as a March hare.*

Although the flesh of hares is rather dry, it is prized for its peculiar flavor. The fur of these animals, especially of those which turn white in winter, is used to imitate more expensive furs (see FUR AND FUR TRADE). F.ST.A.

Consult Seton's *Wild Animals I Have Known;* Sharp's *Wild Life Near Home.*

HAREBELL, *hair'bel,* a familiar species of the bellwort, common throughout the northern parts of North America, but rarely found south of Canada. It grows in dry and hilly localities, by the wayside and in open places generally. It is a perennial, with a slender stalk six to fourteen inches high. Its flowers, which are generally bright blue, but sometimes

white, appear in summer and autumn. They yield a bright blue juice which may be used for ink.

HAREM, *ha'rem,* from the Arabian, meaning *that which is sacred, set apart, forbidden,* is the name given in Mohammedan countries to the part of the dwelling reserved for female members of the household, and from which all men, excepting the husband and intimate male relations, are excluded. The term also signifies the inmates themselves.

As an institution the harem is of remote origin. It existed among the ancient Babylonians and Persians, and among all those races which, while sanctioning polygamy, or plurality of wives, have attained some degree of civilization. It reached its greatest development, however, among the Mohammedans. The most famous harem is that of the sultan of Turkey at Constantinople; its inmates are said to be allowed greater liberties than those of similar institutions. The Koran allows four wives to a Mussulman, and an indefinite number of concubines, or female slaves, but owing to the expense of maintaining more than one establishment, the majority of Turkish and Persian men have only one wife. Within the harem the woman rules supreme; there, surrounded by attendants, she receives her female friends and indulges in the various occupations and amusements at her command, such as spinning, sewing, witnessing the dances of the slaves, and in the numerous rites of self-ornamentation.

While royal harems may be regarded as permanent institutions, individual maintenance of such establishments in Oriental countries is said to be losing ground, principally because women are demanding and achieving, little by little, a much greater degree of freedom. See ZENANA.

HARGREAVES, *hahr'greevz,* JAMES (about 1720-1778), the inventor of the carding machine and the spinning jenny, which, with the power loom invented by Cartwright, revolutionized the cotton industry and placed it on a new basis. He was a poorly educated Englishman, who earned his living by weaving and spinning in his home at Stanhill. After producing the spinning jenny in 1764, he sold a few of the machines, which performed eight times the work of a hand spinner. Some of his fellow workers became jealous of the amount of work he could do, so they broke into his house and destroyed the machine. He then moved to Nottingham in 1768 and erected a spinning mill, but manufacturers stole his design. As it was proved that he had sold some of the machines, the government refused to give him a patent; so he never profited by his invention.

HARLAN, JOHN MARSHALL (1833-1911), a former Associate Justice of the United States Supreme Court, who rendered distinguished service in that position for over a third of a century. He was born in Boyle County, Ky., was graduated from Center College in 1850 and studied law at Transylvania University. After his admission to the bar he practiced law in Frankfort, Ky., and was elected county judge in 1858. On the outbreak of the War of Secession he organized for the Federal cause the Tenth Kentucky Infantry, was made its colonel and served under General Thomas until 1863, when he resigned. He was attorney-general of Kentucky from that year to 1867. On November 29, 1877, he was appointed to the Supreme Court by President Hayes and served for thirty-four years, Chief Justice John Marshall alone exceeding this length of service, and only by a few months. Justice Harlan was considered one of the ablest members of the Supreme Court; he wrote the opinion in the famous Northern Securities case, and supported the clause of the Wilson Tariff Bill for an income tax. He taught constitutional law at George Washington University in Washington, D. C., for fifteen years, and was one of the American arbitrators in the Bering Sea Tribunal which met in 1903 in Paris.

HARLEQUIN, *hahr'le kwin,* a pantomime performer, who figured in Italian comedies. His rôle was characterized by great bodily agility and buffoonery of an extravagant nature, and was therefore like that of the modern clown. In the Christmas pantomimes of England and Scotland, Harlequin is a lover and magician, his chief duty being to protect his sweetheart, Columbine, from the persecutions of Clown and Pantaloon. In France and Italy the rôle was dignified and popularized by such actors as Vizentini, Rich and O'Brien. The costume of Harlequin consists of tights, fantastically varied in color and covered with spangles.

HARMONICA, *hahr mon'i ka,* a musical instrument invented by Benjamin Franklin, consisting of a series of cup-shaped glasses which were made to revolve, while their moistened rims were touched by the finger. The compass of its notes was from C to F. The idea is said to have originated with an Irishman

Puckeridge. Many attempts to substi- eys for the finger were unsuccessful, as man touch imparted a tone to the sound no inanimate substance could supply. ll wind instrument, or mouth organ, r with boys everywhere, is also called ıonica.

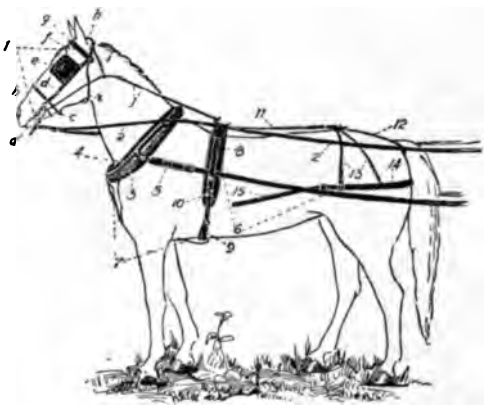
MONICS, *hahr mon'iks,* the accessory which accompany any string, pipe or clear-sounding body. Every musical consists of a principal or fundamental accompanied by higher tones, or har- , which blend and generally harmonize . As a test, strike a low note on a piano, ; down the loud pedal. As the sound way, the harmonics (or partial tones) heard distinctly. When a sound is pro- by the vibration of a string, the string s as a whole, giving rise to a tone called *ndamental.* This string, however, di- nto various sections which vibrate sep- and produce sounds differing from the ıental but blending with it; these sounds *harmonics.*

first harmonic of the fundamental note ' string is that produced by half the and is the *octave* of the fundamental the second harmonic is produced by hird of the string and is the fifth, or *nt,* of the fundamental note; and so on, mplete series of harmonics containing notes of the musical scale. The pecu- cognizable character of all sounds— r voice, piano, organ, violin, or any musical instrument—is due to the pres- f harmonics, each with its own degree lness, thus producing different qualities e. See MUSIC; SOUND.

MONY, *hahr'mo ni,* that branch of l science which deals with chords, their ution, and their relation and progres- It is the result of the development of ıental music, just as counterpoint, the which preceded harmony, grew with velopment of song. It is a fundamental of musical theory and composition, the ance of which can readily be realized he fact that any simple melody can be o arouse widely variant emotions when different harmonic settings. Claude verde, during the seventeenth century, ıced combinations of sound forbidden nterpoint and laid the foundation of ı harmony. The science made great s under Bach, Wagner, Mozart and ven. In fact, innumerable examples of the principles underlying harmony are found in the works of all great composers, for in many instances the beauty and power of their compositions depend largely upon the harmonies which they are able to form about a single simple theme. Among the famous books on harmony are those by Rameau, Logier, Sir George Macfarren and Sir John Stainer. See MUSIC.

HARMSWORTH, ALFRED CHARLES WILLIAM. See NORTHCLIFFE, LORD.

HAR'NESS, the tackle worn by a horse, mule, donkey or other draft animal when at-



PARTS OF THE HARNESS

1. Bridle; used to hold the bit in the mouth and to restrain the horse. The parts are bit (*a*), nose band (*b*), chin band (*c*), face band (*d*), blinds (*e*), winker braces (*f*), brow band (*g*), crown band (*h*), gag swivel (*i*), side check (*j*), throat latch (*k*).
2. Lines; used to control and restrain the horse.
3. Collar; used to protect the shoulder, thus enabling the horse to draw heavy loads without injuring the shoulder.
4. Hames; used to distribute weight along the collar.
5. Hame tugs; used to fasten the traces to the hames.
6. Traces; used to connect the hame tugs to the load.
7. Martingale; often used to hold the collar in place in backing a load, and sometimes attached to the lines to hold the horse's head in position.
8. Saddle; used to protect the back from the weight of the shafts, to receive the check rein, to hold the lines and the parts of the harness in place.
9. Girth; used to hold the harness in place.
10. Shaft tug; used to hold the shafts in place.
11. Back strap; used to hold the saddle, hip straps and crupper in place.
12. Crupper; used to hold the hip straps, and in connection with the back band to hold the saddle in place.
13. Hip straps; used to hold the breeching in place.
14. Breeching; used in connection with backing the load.
15. Holdback straps; used to connect the breeching with the load in order to hold back and in backing.

tached to a vehicle. The harness is usually made of leather, and has buckles and clasps to keep it in place. The most important parts

are the collar and the traces, which enable the animal to pull a load, also to help hold it back on a down grade. The bridle and bit and other parts of the harness are usually ornamented with brass or silver plate. The use of blinds, or blinkers, is gradually being abandoned, as they prevent the animal from seeing clearly and serve no good purpose.

HAROLD, *hair'uld,* the name borne by two kings who ruled England before it became a united nation through the conquest of William of Normandy (see WILLIAM I, THE CONQUEROR).

Harold I, surnamed *Harefoot,* was the son of Canute, king of England, Denmark and Norway. On the death of Canute, in 1035, Harold claimed the throne in opposition to his brother, Hardecanute, who was then in Denmark. In order to avoid civil war an agreement was made that Harold should become king of the provinces north of the Thames. In 1037, however, he was crowned king of all England, as the people were tired of waiting for Hardecanute to return. Harold died in 1040, when his brother was making preparation to invade England.

Harold II (1022-1066), successor of Edward the Confessor (which see), was the last Anglo-Saxon king of England. He was the son of the powerful Earl Godwin, whose death in 1053 left him Earl of Wessex and head of the National party, which was striving to weaken the influence of the Normans at the court of Edward the Confessor.

In 1064 he visited Normandy. The story has come down that he was shipwrecked on the coast of Normandy, and falling into the power of Duke William, was forced to take an oath that he would aid the latter to become king of England. Two years later Edward the Confessor died, and the assembly of nobles (Witenagemot) elected Harold king. William of Normandy at once laid claim to the throne, and in September, 1066, invaded England at the head of a large army. At Senlac, near Hastings, Harold met defeat and death, and England passed to Norman rule.

Related Subjects. Other historical material connected with these men will be found in the following articles:

Hardecanute	William I, the Conqueror
Hastings, Battle of	Witenagemot

HAROLD, or **HARALD,** the name of four of the early kings of Norway.

Harold I (about 850-933) became sole king of the Norwegian realm in 872, after many years of warfare against the numerous petty kings or jarls, who then ruled in Norway. According to legend, he was inspired in his labor of conquest by his love for a beautiful maiden who refused to become his wife until he had subjugated the entire country. After establishing his authority, Harold drove out the conquered rulers, who made numerous settlements on the neighboring islands. During his reign he was engaged in suppressing the sea pirates and brigands who had long harassed the country.

Harold III (1015-1066), a descendant of Harold I, ruled as king of Norway from 1046 to 1066. Early Norwegian literature abounds with stories of his exploits as captain of the bodyguard of the Greek emperors at Constantinople. He was ruled by his adventurous spirit even after he had become king of Norway, and on concluding a war with the Danes invaded England in 1066, to aid Tostig against his brother Harold, king of England (see HAROLD, subhead *Harold II*). At the Battle of Stamford Bridge, both Harold of Norway and Tostig were slain.

HARP, the most ancient of stringed musical instruments, was, according to the Bible, invented by Jubal. From remote times the favorite instrument of the Irish bards, it has become, like the shamrock, an emblem of Ireland; to the poets of Erin, the silencing of the harp is the symbol of the decline of national glory. So runs the theme of one of Thomas Moore's finest lyrics:

> The harp that once through Tara's halls
> The soul of music shed,
> Now hangs as mute on Tara's walls
> As if that soul were fled.
> So sleeps the pride of former days,
> So glory's thrill is o'er;
> And hearts that once beat high for praise
> Now feel that pulse no more.

The harp was used for accompaniment to the psalms sung by the early Christians, and is intimately associated with David, the poet-psalmist of the Bible. The double harp, or, as it is also called, David's harp, is played with the fingers and thumbs of both hands. It is a triangular-shaped instrument, with a sounding board and catgut strings. It is always tuned in the principal key of the music, while by pressing with the thumb or turning the tuning-pins of certain notes, the strings are changed to suit any modulations out of the key.

The pedal harp, a perfected form of the double instrument, developed about 1720 with the invention of Hochbrucker's mechanism.

This included seven pedals, by means of which each note of the scale, in all the different octaves, can be made a semitone higher. By Errard's invention of the double-action pedal harp in 1820, the instrument reached its highest development. This improvement permitted two changes in the length of the strings, with corresponding changes in the tone. The insistent and mellowed sweetness of the harmony and the artistic appearance of the instrument render it an effective medium for orchestral and recital music. As many as eight harps figure in the final scene of Wagner's opera *Das Rheingold*.

THE HARP
The standard size has the column 64 inches high; the extreme width is 33 inches. It has 43 strings, the longest of which is 57 inches. The weight averages 53 pounds.

HAR'PER, WILLIAM RAINEY (1856-1906), an American educator, first president of the University of Chicago and the real inspiration of much of its greatness. He was born at New Concord, Ohio, studied at Muskingum College and at Yale, and in 1879 became professor of Hebrew at the Union Theological Seminary (Baptist) in Chicago. There he established an unusual reputation as a Hebrew scholar, and in 1886 was made professor of Semitic languages at Yale. In 1891, when the new University of Chicago was founded, he was called to be its head, and proved himself no less noteworthy as an administrator than as a scholar. After a notable career of nearly fifteen years at the university his heroic struggle with disease and his determination to keep on with his work in the face of suffering and of death won for him wide respect and admiration. His publications almost all deal with some phase of Hebrew language or literature, and include *Elements of Hebrew*, *Elements of Hebrew Syntax* and *Amos and Hosea*. He also wrote *The Trend of Higher Education* and edited the *Biblical World*, the *American Journal of Theology* and the *American Journal of Semitic Languages and Literature*.

For illustration of "Harper Memorial Library," see CHICAGO, UNIVERSITY OF.

HARPER'S FERRY, an historic village of West Virginia, made famous by John Brown's raid in 1859, one of the critical events preceding the War of Secession. Located on the Potomac, fifty-five miles northwest of Washington, where the river breaks through the Blue Ridge Mountains and meets the Shenandoah, the town is very picturesque and was considered a strategical point by the Confederate government. At the outbreak of the War of Secession the small band of Union soldiers who occupied the garrison departed, leaving the place to the militia from Virginia under General Johnston. Two months later Johnston abandoned it and Union soldiers again took possession. For over a year they occupied the town, until, on September 15, 1862, General Jackson captured it, taking 12,520 prisoners. At present the population numbers about 750.

HARPIES, *hahr'piz*, a Greek word meaning *the snatchers*, were in Greek mythology the ministers of divine vengeance, defiling everything they touched. A harpy was represented as a winged monster, having the face and body of a woman, the wings of a bird of prey and with feet and fingers armed with sharp claws. The harpies were generally supposed to be two or three in number, but occasionally several others were mentioned; Homer refers to but one. Originally they were conceived to be storm winds, but were later represented as winged maidens, their general characteristics being hideously repulsive.

HARPOON', a word derived from the French *harpon*, (grappling iron), is the name of a weapon used for capturing large fish and whales. In its oldest form it consisted of a triangular piece of iron with strong, sharpened barbs on each side, attached to a handle about three feet long, to which was fastened a long rope. It was thrown by hand at the object of attack. The harpoon now in most common use is known as the *toggle iron*, and is a long, pointed shaft in which a pivoted crosspiece is fastened near the end. After the shaft has penetrated the whale's tissue and the rope is pulled, the crosspiece sets at right angles and prevents its withdrawal. The boat draws closer to the whale as the rope is hauled in, and the animal is then killed by a lance. A harpoon gun is a form of gun from which a

toggle iron can be fired, some guns being so large as to be mounted in a whaleboat like a cannon. Few harpoons are now thrown by hand.

HARPSICHORD, *hahrp'si kawrd,* a keyed and stringed musical instrument, now little known. The modern piano is an evolution of the harpsichord, and in appearance and internal arrangement the two are somewhat similar. The keys, all of one color, were in front, the long ones being the naturals and the short ones the sharps and flats. The date of the invention of the instrument is uncertain, but it is known to have been introduced into England early in the seventeenth century.

HARPY, *hahr'pi,* a large bird, probably of the eagle family, named after the harpies in mythology (see HARPIES). It is a bird of prey, about forty-two inches long, with large, powerful talons and a strong, hooked beak. Being very active, it is able to swoop down after small animals and birds, snatching them up in its talons and devouring them. It is grayish in color, barred with black, and has a white breast, while its white head has a dark crest. The harpy is a native of tropical America, from Southern Mexico to Brazil. It makes its nest in a tall tree or on the ledge of a high cliff, where it lays five eggs. A greedy, unfeeling person is often called a harpy, probably a suggestion also derived from the harpies.

HAR'RADEN, BEATRICE (1864-), an English author, whose first novel, *Ships That Pass in the Night,* made her at once famous in two hemispheres. She was graduated from the University of London at the age of twenty-one. She wrote *Ships That Pass in the Night* when she was so ill that she could not hold a pen, and was obliged to use a peculiar device that she held in the palm of her hand. The lines that suggested its title occur in Longfellow's *Tales of a Wayside Inn:*

Ships that pass in the night, and speak each other in passing,
Only a signal show and a distant voice in the darkness,
So on the ocean of life, we pass and speak one another,
Only a look and a voice, then darkness again and silence.

Her book passed through thirteen editions in England but, unfortunately, she had not secured a copyright in the United States, and the novel was "pirated" by unscrupulous publishers. Her next book, *At the Green Dragon,* elicited the interest of England's queen, who inquired about the author. In 1894 H raden visited the United States and a time on a California ranch. Her o els include *In Varying Moods, The* and *Hilda Strafford,* besides which s a great many short stories.

HARRIMAN, *hair'i man,* EDWARI (1848-1909), an American capitalist road builder, born at Hempstead, L. a common school course, he becam in a New York brokerage office, ar age of twenty-two had accumulate money to buy a seat on the New Y Exchange. He prospered greatly in l lations, and showed so thorough a standing of American railways that he was elected to be a director of th Central Railroad. In 1887 he beca president of the road and showed extr executive ability. In 1898 Harrima the financial backing of a great N banking house, and through it gaine of the Union Pacific, then in an imp condition. Within two years he had a highly efficient line, and this succe his acquiring so many other large l at his death he controlled at least 60 of road. His competitive methods times so harsh and bitter that he f met with criticism, and in 1907 receiv public denunciation from President R but whatever his methods, he vastly American transportation facilities.

HAR'RIS, JOEL CHANDLER (1848- American story-writer whose tales Remus," "Br'er Fox" and "Br'er Rab made him a favorite with every reader. "Br'er Rabbit" is the hero stories, and the clever tricks by which he outwits the sly "Br'er Fox" rouse the keenest and most gleeful delight in his little admirers. Children are not alone in finding pleasure in "Uncle Remus's" tales. To the student of negro folklore these are intimate, faithful information, pos genuine scientific value.

JOEL CHANDLER

Harris was born at Eatonton, Ga. prenticed to a printer and later stu

e instinct for writing was strong in him, wever, and he turned to journalism, begin- g in 1876 that connection with the Atlanta nstitution which lasted twenty-five years. is "Uncle Remus" tales, contributed to this aper, were so successful that he published hem in book form in 1880 as *Uncle Remus: His Songs and Sayings*, and later followed this first volume with *Nights with Uncle Remus* and *Told by Uncle Remus*. He also wrote *Georgia from the Invasion of De Soto to Recent Times*, a life of Henry W. Grady, *Daddy Jake the Runaway, The Tar-Baby and Other Rhymes, Aaron in the Wildwoods* and *Tales of Home Folks*.

HARRIS, ROBERT (1849-), a Canadian inter whose best known work, *The Fathers Confederation*, now hangs in the Parliament ildings at Ottawa. He was born in Wales, t when a mere lad went to Prince Edward and, where he later attended Prince of Wales llege at Charlottetown. At first he taught nself how to paint, but later studied in Lon- a and Paris, and also traveled through Italy, lgium and Holland. In 1883 he took up his idence in Montreal and became the director the Art School of the Montreal Art Associa- n. Two of his pictures which have attracted st attention are *The School Trustees* and e *Fathers of Confederation*, which were nted under commission from the Dominion vernment. He has also painted portraits of ny well-known Canadians. Harris was one the original members of the Royal Canadian ademy, and was its president from 1893 to 8. G.H.L.

HARRIS, WILLIAM TORREY (1835-1909), an erican educator and philosopher, the second mmissioner of ucation of the ited States, ich post he ld for seven- en years. He ndered notable rvice in the velopment of ducation in the nited States by ason of his in- ght into educa- ional problems nd his ability to ive clear and definite statements of the the- ries of teaching. He was born in Connecticut nd was educated at Phillips Andover Academy and at Yale College. In 1867 he became superintendent of the Saint Louis public schools, holding office for twenty-one years. Between 1889 and 1906, as United States Commissioner of Education, he won wide fame as an able and practical educator.

WILLIAM T. HARRIS
For seventeen years United States Commissioner of Education.

Dr. Harris founded, in 1867, the *Journal of Speculative Philosophy*, the first periodical of its kind in the English language. He was chief editor of the *International Education Series* and of *Appleton School Readers*, editor of the department of philosophy in *Johnson's Encyclopaedia*, and editor-in-chief of the 1910 edition of *Webster's New International Dictionary*. In addition, he was the author of numerous works on philosophy and education.

HARRISBURG, PA., the state capital and the county seat of Dauphin County, located southeast of the geographical center of the state, 105 miles west and north of Philadelphia. It is situated on the east bank of the Susquehanna River, and is on the Cumberland Valley, the Pennsylvania and the Philadelphia & Reading railroads. The city has electric interurban service. At this point the river is a mile wide and is crossed by several steel bridges. In 1910 the population was 64,186; it was 72,015 in 1916, by Federal estimate. The area of the city exceeds five square miles.

Buildings and Institutions. The Capitol building is surrounded by a park of fifteen acres and occupies a prominent site in the city. Replacing the structure which was burned in 1897, the new building was completed in 1907 at a cost of $4,000,000. It is constructed of steel and brick, veneered with granite on the exterior and finished on the inside in marble. On its walls are mural paintings by Edwin A. Abbey, John W. Alexander, Miss Violet Oakley and W. B. Van Ingen, who also designed the stained-glass windows for the House Chamber. George Grey Barnard designed two large groups of statuary for the building. Before the main entrance, in which swing splendid bronze doors, is a large fountain seventy-eight feet wide. Among other structures in Capitol Park is the state library, containing more than 170,000 volumes.

Other prominent buildings include the governor's residence, the courthouse, a state arsenal, a Y. M. C. A. building, and a large Roman Catholic cathedral. There are several noteworthy monuments; in State Street is the Dauphin County Soldiers' Monument, a shaft ten feet square at the base and 110 feet high, erected in honor of the soldiers of the county

who died in the War of Secession; and in Capitol Park is a column of Maryland marble, seventy-six feet high, erected in honor of those who lost their lives in the Mexican War. A statue of General John F. Hartranft stands on the west side of the Capitol.

The institutions of the city include Saint Genevieve's Academy, the Young Ladies' Seminary, the Home for the Friendless, the Children's Industrial Home, a city hospital, a state insane hospital and a county prison.

Industries. Harrisburg is near large iron and coal mines, and this location, together with excellent railroad facilities, has led to the extensive manufacture of iron and steel. The city has an important trade in lumber, and has foundries and machine shops, rolling mills, tin mills, nail works, furnaces, typewriter factories, boot and shoe factories, pipe-bending works, and large manufactories of cars, coaches, tanned leather, lumber products, cotton goods, beds, mattresses, coffins, silk goods, brooms, brick and tile, marbleized slate and galvanized-iron cornices. Several thousand employed in the roundhouses and rep of the Pennsylvania Railroad, which cated here.

History. The town of Harrisb named in honor of John Harris, wh there in 1726, near what he considere ford of the river. It was organized by his son, who had established a this place, and was made the county 1785, becoming the state capital in 1 1860 it became a city. The Harrisb vention, assembled here in 1828, was ble for the high protective-tariff bill year. Harrison and Tyler were nomi the city in 1839. An extensive pr municipal reform, which included the ment of the water supply, sewerage the building of a dam, and park impr was successfully undertaken in 1901 board of public works continues to carr plans made by thorities for provements.

HARRISON, BENJAMIN (1833-1901), an American lawyer and soldier, the twenty-third President of the United States. Like nearly all the Presidents, Harrison was a lawyer by profession, but he differed from them in that he was not a politician or a political leader. With the exception of the Presidency, Harrison held but two public offices in his life, and one of these, that of reporter of the Indiana supreme court, was strictly in the line of his profession. He was a loyal member of the Republican party and took an active interest in politics, but he was not, strictly considered, a popular leader. As a soldier in the War of Secession he had won considerable distinction, but his military career lacked the spectacular element which played so large a part in the career of his grandfather, William Henry Harrison, who also was President, but for only a month.

Benjamin Harrison was a hard-working, conscientious official, but he did not inspire enthusiasm. He was called "cold," so "grass would not grow on the Whit grounds," and it was said, most unkin "his political advisers rode in ice Such exaggeration was ridiculous, but no doubt that Harrison's integrity, h tion to principle and his refusal to the demands of "everyday political ency," all combined to give him a aloofness. In some respects he was n Grover Cleveland, his predecessor and cessor, and it is noteworthy that both their greatest personal popularity close of their terms of office.

Youth and Education. Benjamin was born on August 20, 1833, at Nor Ohio, where his grandfather, Williar Harrison, was also then living. He w for his great grandfather, one of the s the Declaration of Independence. H John Scott Harrison, was Represent

ess from 1853 to 1857, but took no other n public life; it has been said, somewhat ritably, of him that his only claim to ction was that he was "the son of a great and the father of a great son." Young min spent his boyhood on his grand- 's farm, and during the winters received tion in the near-by log schoolhouse. he was instructed by a private tutor, d for two years at an academy near Cin- ti, and in 1852 was graduated from Miami rsity. A year later he was admitted to ar, and in 1854 removed to Indianapolis, which was thereafter his home.

a Lawyer and Soldier. When young son went to Indianapolis he had only one intance in the whole community; that

BENJAMIN HARRISON

ancestors were distinguished. One was a utionary patriot and signer of the Declara- of Independence; another was a military and also a President of the United States.

the clerk of the Federal court, gave him space, and allowed him to hang his legal at the door. For a short time Harrison ontent to act as court crier at $2.50 a but when clients began to come to him uickly proved his industry and ability. ad the advantage, moreover, of a dis- shed name, and in a few years he took ank at the bar.

War of Secession interrupted Harrison's career. When it broke out he was acting porter of the Indiana supreme court, his public office. At the end of his two-year in 1862, he accepted a military commis- as second-lieutenant of volunteers. He at helped to raise a new regiment, the Seventieth Indiana, and when it was completed, in August, 1862, was commissioned its colonel. His regiment participated in numerous engagements in Kentucky and Tennessee in 1862 and 1863, was with Sherman in the campaigns around Atlanta and with Thomas in the battles around Nashville in 1864. He commanded a brigade at the battles of Kenesaw Mountain, Peach Tree Creek and Nashville, and his leadership in these battles won him praise and the brevet rank of brigadier-general, for "ability and manifest energy and gallantry."

In 1864, while still in the field, Harrison was again chosen reporter of the Indiana supreme court, and after the war ended he performed the duties of this office for three years. He refused to be a candidate for reëlection in 1868, and returned to the private practice of law. In 1876 he was the Republican candidate for governor, but his candidacy was undertaken from a sense of duty when the regular nominee declined to run. Though his defeat was a foregone conclusion, he ran 2,000 votes ahead of his ticket. In 1879 President Hayes appointed him a member of the Mississippi River Commission, under whose direction extensive river improvements were to be made. In the next year he was active in securing the nomination and election of James A. Garfield to the Presidency, and was offered a place in Garfield's Cabinet. This he declined, preferring to take his seat in the United States Senate, to which the Indiana legislature had just elected him.

In the Senate. Harrison's ability and his capacity for hard work showed to his advantage in the Senate. He was chairman of the Committee on Territories, and urged the admission into the Union, as states, of the five territories, North and South Dakota, Washington, Idaho and Montana. He was also at various times a member of the committees on Foreign Relations and on Military and Indian Affairs. He was strongly in favor of a greater navy, of civil service reform, and of larger pensions for ex-soldiers. His demand for larger pensions brought him into conflict with President Cleveland, who was vetoing a great number of pension bills. In the Indiana elections of 1886 the Democrats won control of the legislature, although the Republicans polled a majority of the popular vote, and Harrison was defeated for reëlection to the Senate. The general feeling among Indiana Republicans was that Harrison was unjustly deprived of his Senatorship, and in compensation, as the Presiden-

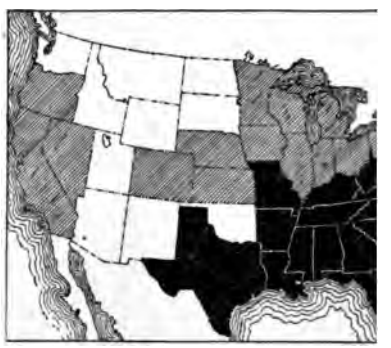
tial election of 1888 drew near, he became Indiana's "favorite son." The leader of the Republican party, James G. Blaine, declined to be a candidate for President, and Harrison was nominated on the eighth ballot at the national convention, which was held in Minneapolis.

The campaign was waged chiefly on the tariff issue, the Republicans declaring themselves "uncompromisingly in favor of the American system of protection." The Democrats, who had nominated President Cleveland for reëlection, demanded "the reduction and correction of the burdens of taxation;" in other words, the latter demanded tariff reform. Somewhat to the nation's surprise, Harrison was chosen by an electoral vote of 233 to 168 for Cleveland, although Cleveland received 100,000 more popular votes than Harrison.

His Administration (1889-1893). At its first session after Harrison's inauguration, Congress undertook to fulfill the campaign promises of the Republicans, and within a year placed on the statute books the Sherman Silver Purchase Act, the McKinley Tariff Act and the Sherman Anti-Trust Act. These laws were supported by a very small majority in the House of Representatives, and would probably have failed to pass except for a change in the rules by which the House managed its affairs. Previously it was possible for members to delay definite action on any bill by *filibustering,* that is, either by making irrelevant and unnecessary motions or simply by refusing to answer to their names when called on to vote. Unless a majority answered to their names, it was the practice to rule that a quorum was not present. Speaker Thomas B. Reed, largely with the assistance of William McKinley and Joseph G. Cannon, forced the House to adopt the so-called "Reed rules," which greatly increased the Speaker's power. Henceforth the Speaker could suppress or disregard unnecessary motions and was allowed to count members who were present but not voting, in order to make a quorum. These changes laid the basis for the development of the Speaker's power, which only came to an end in 1910 (see CANNON, JOSEPH GURNEY).

The McKinley Tariff Act was named for its author, later President of the United States. It provided a high protective tariff on imports, the exact reverse of the Democratic principle of "tariff for revenue only." The public, unfortunately, did not regard the law as satisfactory, and expressed its disapproval in the autumn elections of 1890 by giving crats a majority in the House of I tives. Another law of 1890 was th Anti-Trust Law (for details, see Tr of the most important laws passed b since the War of Secession.

John Sherman, the author of the *Act,* was chairman of a committ Senate which reported for passage a Purchase Act. The Bland-Allison A which required the Treasury to buy worth of silver each month, no long the silver interests, which were a manding the free and unlimited silver. So strong were the "silverite



ELECTION OF 1888

Shaded states, Republican, electing states shown in black, Democratic, Cleveland. White divisions represent territories.

houses of Congress that further legi inevitable. Harrison proposed a c which was adopted in the *Sherman* Secretary of the Treasury was requi 4,500,000 ounces, or about 140 tons each month, and to issue treasury ce exchange to the full market value lion. While it is now generally adr the law was a mistake, and was at l responsible for the panic of 1893, good result in that it showed the in of compromise, and brought the face a clear-cut issue between the gol and the free coinage of silver.

The Surplus and Its Reduction. I ber of years the United States Tr been confronted with a growing gold in reserve; in other words, t ment was receiving more money tl spending. During Harrison's adn Congress passed several laws which altered the situation. The laws passed primarily because there was but without the surplus they woul

OUTLINE AND QUESTIONS ON BENJAMIN HARRISON

Outline

I. Years of Preparation

(1) Birth and family
  (a) His great-grandfather signed Declaration of Independence
  (b) His grandfather was President
(2) Education
(3) Early legal practice

II. Early Public Life

(1) Reporter of Indiana supreme court
(2) Military career
(3) Candidate for governor
(4) Member of Mississippi River Commission
(5) In the United States Senate
  (a) Activity in pension debate
(6) Election to Presidency
  (a) The issue
  (b) Results

III. Administration

(1) Legislation
  (a) Sherman Silver Purchase Act
  (b) McKinley Tariff Act
  (c) Sherman Anti-Trust Act
  (d) Chinese Exclusion Act renewed
(2) Other governmental affairs
  (a) "Reed Rules" adopted in the House
  (b) "Spending the surplus"
    1. Great increase in pension fund
    2. Appropriation of money for new battleships
  (c) Oklahoma opened for settlement
  (d) Admission of states to Union
    1. North Dakota
    2. South Dakota
    3. Montana
    4. Washington
    5. Idaho
    6. Wyoming
(3) Foreign affairs
  (a) International Copyright Act
  (b) Pan-American Congress
  (c) Bering Sea Controversy
  (d) Friendship with Italy threatened by Mafia trouble in New Orleans
    1. Indemnity paid by United States
  (e) The dispute with Chile
  (f) Controversy over Samoa
  (g) Attempt to annex Hawaii
  (h) Reciprocity treaties with Spain and Brazil
(4) Other events
  (a) Australian ballot system adopted
  (b) Great flood at Johnstown, Pa.
  (c) Homestead riots
(5) Election of 1892
  (a) Candidates
  (b) Issues
  (c) Result

Questions

On what subject did Harrison come into conflict with the President that preceded him?

When did Harrison decline a high official position, and for what reason?

Why were the expenses of the government much heavier at the close of Harrison's administration than at the beginning?

When was the expression "ability and manifest energy and gallantry" applied to him?

What was the chief issue in both campaigns in which Harrison was a candidate?

What important part did Blaine play during this administration?

What important act of this administration was drawn up by and named for a future President of the United States?

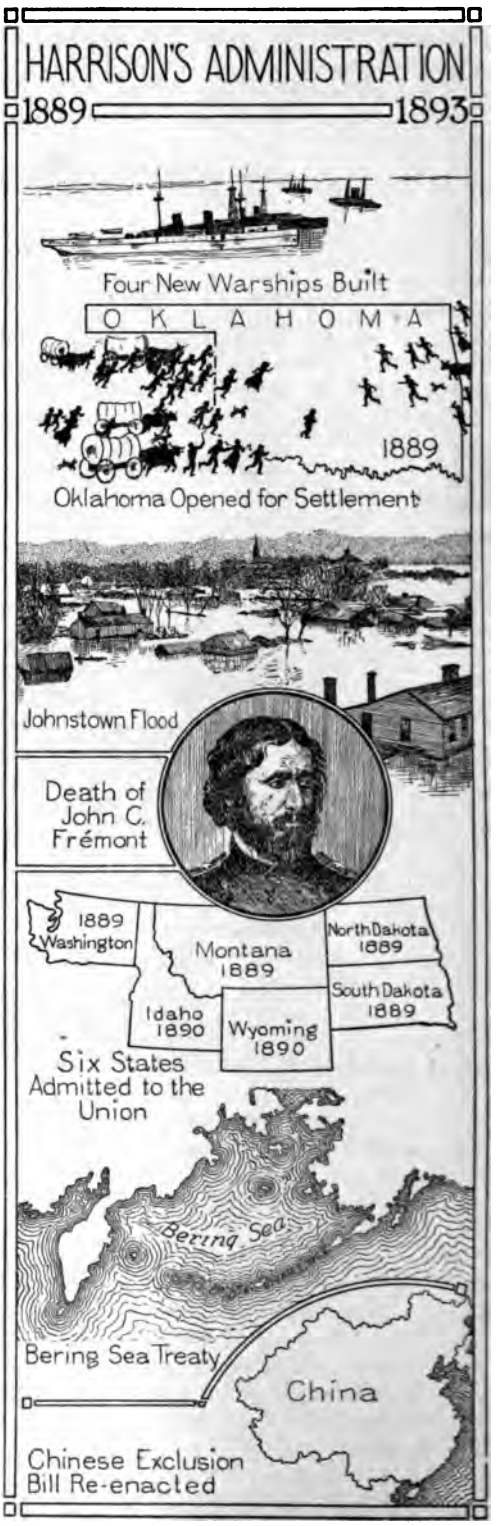
What country had to apologize to the United States and to what country did the United States have to apologize during this administration?

What was *filibustering,* and what part did the "Reed rules" have in doing away with it?

not have been passed. One of the ostensible purposes of the McKinley Tariff Act was to reduce the revenue, but this it failed to accomplish. The most effective means taken to reduce the surplus was the *Dependent Pension Bill* of 1890. Harrison had long been in favor of more liberal pensions, and in response to his views Congress authorized pensions for all Federal soldiers who had served ninety days in the War of Secession and were now incapacitated, for any reason whatever, from earning their living. This act nearly doubled the number of pensioners, and the pension fund has ever since been the largest item of government expenditure. Congress also appropriated large sums of money for new battleships, and the "new navy," as it is known, dates from 1890. The first of the modern steel battleships in the American navy were begun in that year.

Development of the West. In 1889 and 1890 six new states were admitted to the Union—North Dakota, South Dakota, Montana and Washington in 1889, Idaho and Wyoming in 1890. Wyoming was the first state admitted to the Union with a constitution granting women and men equal rights in voting and office-holding. The year 1889 was also noteworthy for the opening of Oklahoma, on April 22. Oklahoma, the Indians' "Beautiful Land," lay in the heart of the Indian Territory, but the government purchased the rights of the tribes and threw the land open to settlement. An army of settlers camped for days and even weeks along the boundary. At noon on April 22, 1889, at the sound of a bugle, the multitude surged across the line, and by the end of that day Oklahoma was the home of 50,000 settlers. This day summarized in dramatic fashion the settlement and expansion of the United States. With the exception of a few scattered Indian reservations, the stream of population had now covered the entire United States. There was no longer a frontier, and settlements extended from ocean to ocean.

Foreign Relations. While the development of the West was continuing, there was also during Harrison's administration a marked development of interest in the foreign relations of the United States. This was due partly to James G. Blaine, the Secretary of State, and partly to a combination of incidents which threatened to involve the United States in war. Under Blaine's leadership the first Pan-American Congress (which see) was held at Washington, and reciprocity treaties were negotiated with Spain and Brazil. The International



Copyright Act of 1891 removed a long-standing injustice by allowing foreigners, under certain conditions, to copyright their own literary productions in the United States. This was a subject in which Charles Dickens had taken an intense interest during his visit to the United States in 1842.

During Harrison's term of office the United States had disputes with four nations, and Congress passed a law which was most displeasing to a fifth. This law was the Chinese Exclusion law of 1892, prohibiting Chinese immigration for a further period of ten years and requiring Chinese residents in the United States to be registered. The most serious of the four disputes, which was with Great Britain, involved the respective rights of British and American citizens in the seal fisheries of Bering Sea, off the coast of Alaska. In June, 1891, both nations agreed on a closed season, and submitted the disputed points to arbitration (see BERING SEA CONTROVERSY). Friendly relations with Italy were nearly broken by an anti-foreign riot in March, 1891, in New Orleans, where eleven Italians were taken from jail and hanged. The United States government expressed its regret, but was unable to promise, as Italy demanded, that the leaders of the mob be punished. Their offense, under the circumstances, could be punished only by the state of Louisiana. The Italian minister then demanded his passports and left Washington, but the matter was finally settled by the payment of $25,000 to the families of the dead Italians. For a time the excitement over this question ran very high.

In a dispute with Chile the situation was reversed, for the United States was compelled to demand apology for an attack on several American sailors by a mob in Valparaiso. A dispute with Great Britain and Germany over Samoa (which see) was settled amicably by the treaty of Berlin, February 4, 1890. One of the most important events of the administration was the attempted annexation of Hawaii (for details, see HAWAII).

Presidential Election of 1892. The chief issue of the campaign was the tariff, on which the Republicans reaffirmed their high-tariff belief, while the Democrats again demanded a tariff for revenue only. Harrison was renominated by the Republicans, and Grover Cleveland by the Democrats. A third party, the People's party, or Populists, voiced the discontent of the agricultural communities of the West, and declared itself in favor of free coinage of silver, a graduated income tax, state control of railroads and government loans to the farmers. The Populist candidate for President, General James B. Weaver of Iowa, received over 1,000,000 popular votes, but only twenty-two in the electoral college. No candidate received a majority of the popular vote, but Cleveland was elected by 277 electoral votes to 145 for Harrison. The Democrats also secured control of both houses of Congress.

Last Honors. After being relieved of the burdens of office, Harrison seemed almost instantly to broaden his views, and the people as a whole listened to his opinions with increasing respect. He delivered a course of lectures at Leland Stanford Junior University, wrote *This Country of Ours*, an interesting study of the practical workings of the United States government, and was a frequent contributor to magazines. He renewed his practice of law, and appeared in several cases of international importance. He was counsel for Venezuela before the arbitration commission which settled the boundary dispute between that country and Great Britain, and in 1899 was the principal representative of the United States at the Hague Conference. Harrison's opposition to President McKinley's policy in connection with foreign possessions was very outspoken, but it was his opinion, nevertheless, that the Republican administration deserved indorsement in the elections of 1900. Harrison's death occurred after a brief illness, on March 13, 1901, at Indianapolis. W.F.Z.

Consult Wilson's *The Presidents of the United States;* Hedge's *Through the South and West with President Harrison.*

HARRISON, N. J., an attractive residential city in Hudson County, on the east side of the Passaic River, opposite Newark. Several steel bridges span the river between the cities. Harrison is served by the Delaware, Lackawanna & Western, the Erie and the Pennsylvania railroads, and by electric lines. The Pennsylvania enters New York City from Harrison by electric lines through the Hudson River tunnels. The population was 14,495 in 1910; in 1916 a Federal estimate reported 16,950. The area of the city is about two square miles.

Harrison has important manufactures of steel, wire cloth, marine engines, hoisting engines, tubes, machinery, roller bearings, refrigerators, ink, leather, trunks, dry batteries, metal novelties, wall plaster, lumber and cut stone. Settled in 1668, in 1873 the place was granted a charter, which is still in force.

HARRISON, WILLIAM HENRY (1773-1841), an American soldier, administrator and political leader, ninth President of the United States and the first President to die in office. He was the son of Benjamin Harrison, signer of the Declaration of Independence, and grandfather of another Benjamin, who became the twenty-third President. William Henry Harrison was the nation's chief executive for exactly one month; his death occurred on April 4, 1841, making his administration the shortest in the history of the United States. He was inaugurated on March 4, and immediately sent to the Senate his nominations for Cabinet officers, which were confirmed. His Cabinet was an able one, including Daniel Webster as Secretary of State, Thomas Ewing of Ohio as Secretary of the Treasury, John Bell of Tennessee as Secretary of War, and John J. Crittenden of Kentucky as Attorney-General. On the seventeenth of March the President issued a call for a special session of Congress to consider measures for improving business and financial conditions. Ten days later he caught a severe cold, which developed into pneumonia, and at the end of the next week the nation was shocked by the news of his death. His body was interred in the Congressional Cemetery at Washington, but a few years later was removed to his old home, North Bend, Ohio, where it was placed in a tomb overlooking the Ohio River.

Harrison's Presidency was the least important period of his life. It is rather as a soldier and administrator that history records his fame. He was one of the few who won military distinction between the close of the Revolutionary War and the end of the War of 1812. In fact, with the exception of Andrew Jackson and Winfield Scott, he was the only officer in the American army during the War of 1812 to add to his reputation. He was a clever negotiator with the Indians and was generally regarded as their friend, yet when occasion required he could fight them as well, as his victory at Tippecanoe showed. He was for eleven years governor of Indiana Territory, which then included about six times the area of the present state, and on this whole region he left the impress of his ability. It was this pioneer section, simple and democratic, which Harrison represented to the nation at large.

Boyhood and Early Career. It must not be supposed that Harrison was an uneducated backwoodsman. He was born on February 9, 1773, at Berkeley, Va., where his father also was born. The Virginia Harrisons were aristo-

WILLIAM HENRY HARRISON
Son of Benjamin Harrison, member of the Continental Congress in 1776 and a signer of the Declaration of Independence; grandfather of Benjamin Harrison, who became President in 1889.

crats and among the best-known families in the colonies. Public service was a tradition in the Harrison family, as it was among the Lees of Virginia and the Adams family of Massachusetts. Young Harrison was given a sound education, and was graduated from Hampden-Sidney College in 1790. His father insisted that he begin the study of medicine, but the death of the elder Harrison in 1791 released

r a future which he dreaded. proved his purpose to be a sol- gust, 1791, commissioned him an First Infantry, then stationed at on, Ohio.

ext seven years Harrison served paigns against the Indians. In ppointed lieutenant and aid-de- al Anthony Wayne, and Wayne's e Indians in the battle of Fallen he Maumee River, was due in an of march suggested by Lieu- n. In May, 1797, Harrison was e rank of captain, and placed in Fort Washington, where he re- he resigned his commission in

after his resignation from the t John Adams appointed him he Northwest Territory, under r St. Clair, as governor (see ERRITORY). After a year he re- ition to take his seat in Congress legate from the Northwest Ter- first delegate from any territory States. Up to this time the the West had been sold only , a practice which favored the it impossible for the poor man omestead. Through Harrison's s authorized the division of land ts and thus laid the foundation homestead laws (which see). He mental in securing the division est into two parts. The west- rritory of Indiana, included the of Wisconsin, Michigan, Illinois and in 1801 Harrison was ap- st governor and superintendent airs. So satisfactory were his e was reappointed by Presidents Madison, and held the position

Indiana Territory. At the time appointment in 1801 the terri- a had a widely-scattered popu- y 5,000 people. Harrison's task y to give these people a gov- to keep peace with the Indians pen the West to more settlers. he had established friendly rela- eral of the Indian tribes, and negotiated thirteen treaties, by ians ceded to the United States ee million acres of land along d Wabash rivers. While the questions of land rights and the relations of the Indians to the new government were thus being adjusted, this very adjustment led to the most serious difficulty Harrison had to face.

The various cessions made by the tribes were bitterly condemned by a few well-known chiefs, among them Tecumseh, a chief of the Shawnees, on the ground that the consent of all the tribes, not of one or several, was necessary to make a legal sale. Agents of the British government, the action of a few speculators who drove Indians from their lands, and the violent preaching of Tecumseh's brother, Ellskwatawa, commonly called the "Prophet," all combined to spread discontent among the tribes. See TECUMSEH.

In an attempt to avert an Indian uprising, Harrison invited Tecumseh to a two-day conference at Vincennes, the territorial capital. The chief arrived at Vincennes on August 12, 1810, not with thirty men, as requested, but with 400 armed warriors. It required all Harrison's coolness to prevent bloodshed on the first day of the council; when the meeting came to an end without result, Harrison, unarmed and accompanied only by an interpreter, made a visit to Tecumseh's camp, in the hope that the chiefs would feel less hostile when they were not under the guns of the fort. The daring of the visit of two unarmed men walking coolly into the midst of a band of savages merely waiting for a signal to kill every white man, impressed the Indians but did not change their minds. In the following spring Indian thefts and plundering became so frequent that Harrison threatened punishment if the raids did not cease. At another council, in the summer of 1811, Tecumseh professed his friendliness to the white men; but Harrison, now convinced of the chief's double-dealing, won over the government at Washington to his plan for checkmating the Indians.

Harrison's purpose was to build a fort on the Wabash River not far from Tippecanoe, where the "Prophet" had established his village. The announcement of this plan brought several hundred volunteers to Vincennes, and in September, 1811, Harrison with 900 men left the capital. Near the site of Terre Haute he built Fort Harrison, and, leaving a garrison there, pressed on to Tippecanoe. On the sixth of November the little army had reached a point about a mile and a half from the Indian camp, when it was met by messengers who requested a council. The next day was fixed for a meeting, but early in the morning the

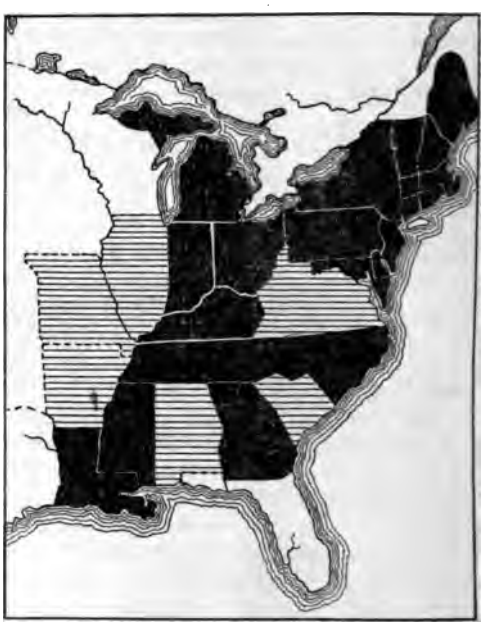
Indians attacked. The fighting continued for two hours, until daylight, when the Indians were driven from the field by a charge. This victory made Harrison a national hero, and was responsible, more than anything else, for his election to the Presidency twenty-nine years later (see TIPPECANOE, BATTLE OF).

In the War of 1812. The battle of Tippecanoe was followed by a general uprising of the Indians, and in the summer of 1812 the United States found itself at war with the British as well. War was declared in June, and on August 25 Harrison was appointed major-general of the Kentucky militia, although he was not a citizen of that state, and took command of a detachment intended to relieve General Hull at Detroit. While on the march he received notice of his appointment as brigadier-general of the regular army. He had proceeded as far as Fort Wayne when word came that he was to have the chief command in the Northwest. The letter of the Secretary of War instructed him to "exercise your own discretion, and act in all cases according to your own judgment." Such wide powers had been given to no other American commander since Washington.

The new commander prepared to concentrate his forces and march on Detroit, but various difficulties postponed this advance until the next year. Through a misunderstanding of orders a part of his forces was lost in the bloody massacre on Raisin River (which see). Harrison then established Fort Meigs, where he was besieged in May, 1813, and again in July, by a superior force under the British Colonel Proctor. Meanwhile, Harrison had been urging the construction of a fleet on Lake Erie, and Perry's naval victory, resulting from this foresight, opened the way to Canada for the American army. It was to General Harrison that Perry sent his laconic message, "We have met the enemy and they are ours: two ships, two brigs, one schooner, and one sloop" (see ERIE, LAKE, subhead *Battle of Lake Erie*).

Harrison's army was now transported across Lake Erie in Perry's ships, and on September 27 landed on Canadian soil. In the Battle of the Thames, October 2, the British were decisively defeated, and Tecumseh, their brave ally, was killed. Together with Perry's victory, this battle ended the war of the West. In the next year, the Secretary of War assigned Harrison to a military district in which he could see no active service, and even issued orders to one of his subordinate officers without consulting Harrison. This combination of slights induced the latter to offer his resignation, which, in the temporary absence of President Madison, was promptly accepted.

A Quarter Century of Varied Activity. Though Harrison's military career was at an end, he remained more or less in the public eye. The ink on his resignation from the army was scarcely dry before President Madison appointed him to negotiate a treaty with the Indians, and in the following year again



ELECTION OF 1840

States shown in black were Whig, electing Harrison and Tyler; cross-shaded, Democratic, voting for Van Buren.

employed him on a similar errand. From 1816 to 1819 he served in Congress as Representative from Ohio, and from 1819 to 1821 was a member of the state senate. He was elected United States Senator in 1825, but resigned in 1828 to become first minister to Colombia. As a diplomat he was not very successful, and in 1829 he was recalled, being one of the first victims of Jackson's to-the-victor-belong-the-spoils policy (see CIVIL SERVICE IN THE UNITED STATES).

On his return from Colombia he lived in semi-retirement at his home in North Bend, Ohio. He delivered occasional speeches on political topics and was frequently mentioned as a possible candidate for public office. For several years he was clerk of the county court

of Hamilton County, a remunerative position which was most acceptable to him, for he was far from wealthy. In the Presidential election of 1836 he received the largest vote of the candidates opposing Van Buren. His candidacy had not been pushed, and his popular strength was a surprise to everyone. His showing in this campaign and his clear, if somewhat colorless, political record made him the most available candidate of the Whigs in 1840. Clay was the real leader of the Whigs, but as a Mason he was opposed by a large element in his party, and as an advocate of a protective tariff he could not win the support of the South. So the choice of the Whigs fell on Harrison.

The Whigs very wisely maneuvered to place the personality of their candidate in the foreground. They adopted no platform, and the only issue was whether or not the Jackson-Van Buren "machine" should remain in power. Even among the Democrats there was much discontent, for the financial policy of Jackson and Van Buren was regarded as the cause of the panic of 1837 and the following business depression. To attract discontented Democrats, the Whigs nominated for Vice-President John Tyler of Virginia, formerly a well-known anti-Jackson Democrat. The campaign was the most exciting which the United States had seen up to that time. "Tippecanoe and Tyler too" was the cry of the Whigs, and it was to his military record that Harrison's election was due. The election is often called "the log-cabin and hard-cider campaign." One end of Harrison's house at North Bend was an old log cabin, long since covered with clapboards. A campaign biography said that Harrison's table, "instead of being covered with exciting wines, is well supplied with the best cider." At first this simplicity received the jeers of the Democrats, but the Whigs eagerly seized the opportunity to make the democracy of their candidate a feature of the canvass. Wherever a Whig orator appeared there were sure to be miniature log cabins and barrels of excellent hard cider. Harrison received 234 electoral votes to sixty for Van Buren.

The President-elect was no longer young, and worn out by the excitement of the campaign, fell a victim to pneumonia before he had time to show his ability in his new post. He was succeeded by Vice-President Tyler. W.F.Z.

Consult Dawson's *A Historical Narrative of the Civil and Military Services of Major-General Harrison*, an old book, but yet in print.

Outline and Questions on William H. Harrison

I. Early Life

(1) Birth and parentage
(2) Education
(3) Choice of military career

II. Most Active Years

(1) Early military service
(2) As secretary of Northwest Territory
(3) As territorial delegate in Congress
  (a) Homestead laws
  (b) Division of the Northwest
(4) As governor of territory of Indiana
(5) In the War of 1812
(6) Political activity
  (a) Negotiations with Indians
  (b) As Representative in Congress
  (c) In state senate
  (d) As United States Senator
  (e) As minister to Colombia

III. Culmination of His Career

(1) Campaign of 1836
(2) Election of 1840
(3) Brief administration
(4) Death

Questions

When was "Tippecanoe and Tyler too" a rallying cry, and what did it mean?

How long was Harrison's administration? What other Presidents have died in office?

How did Indiana differ in his day from Indiana to-day?

When was a famous battle fought in the dark?

How many times did Harrison run for President?

Did he win his chief military fame during a great war?

What territory did he gain for the country by his treaties with the Indians?

What power was conferred upon him which was wider than any man before him except Washington had enjoyed?

What part did "log cabin and hard cider" play in electing a President?

What other members of Harrison's family have been famous?

Who was the "Prophet," and what part did he play in Harrison's history?

Who sent the message "We have met the enemy and they are ours," and to whom did he send it?

Under what famous Revolutionary general did Harrison first serve?

How did Harrison once prove his great courage and coolness?

HART, ALBERT BUSHNELL (1854-), an American historian and educator who has made his influence felt throughout the United States in connection with modern methods of studying history; that is, by investigating original sources. He was born at Clarksville, Pa., prepared for college at Cleveland, Ohio, and in 1880 was graduated from Harvard University. Three years later he received a degree at Freiburg University, Germany, and on his return to America became instructor in American history at Harvard. Various promotions followed, until, in 1910, he was made professor of government in the university.

His work as an author and editor is notable. From 1894 to 1902 he was joint editor of the *Harvard Graduates' Magazine,* and from 1895 to 1909 was one of the editors of the *American Historical Review.* He has also edited several series on American history and government, especially *The American Nation, A History* (1904-1907), and was joint editor of the *Cyclopaedia of American Government* (1910-1914). His numerous books on historical subjects include *Actual Government* (1909), *Formation of the Union* (1890), *The War in Europe* (1914) and *The Monroe Doctrine, An Interpretation* (1915). He enjoys high rank among modern American historians, and has served as president of the American Historical Association and of the American Political Science Association.

HARTE, *hahrt,* [FRANCIS] BRET (1839-1902), an American poet and short-story writer, usually known as BRET HARTE, whose picturesque and realistic tales of life in the mining camps of California are among the best short stories in American literature. He was born in Albany, N. Y., but his father died when he was young, and at the age of fifteen he went to California with his mother. There he drifted with the human tide, trying, at different times, to make his way as a miner, school-teacher, express messenger and typesetter. Meantime, the varied life and scenery of the California plains and mountains were making impressions that he later reproduced with wonderful fidelity; the types of character that live in his pages he was becoming familiar with through personal contact and observation.

BRET HARTE

In 1857 he was employed as a typesetter by the *Golden Era,* a weekly newspaper of San Francisco, and for it he began to write sketches that eventually won him the position of assistant editor. In 1864 he joined the staff of the *Weekly Californian,* in which appeared the clever parodies on the styles of various authors that were later published as *Condensed Novels.* At the same time he became secretary of the United States Branch Mint at San Francisco, an office which he held until 1870.

It was in 1868, when he became editor of the newly-founded *Overland Monthly,* that Bret Harte won national fame by publishing *The Luck of Roaring Camp,* the first of those Western tales that best represent his genius. It was followed by *The Outcasts of Poker Flat, Tennessee's Partner, Miggles, An Idyl of Red Gulch* and others, stories in which the grandeur of California scenery serves as a background for narratives of the wild and often dissolute life of the "Forty-niners," as the early gold-seekers were called.

Adventurers, gamblers, wrecks of humanity of both sexes, move across his pages, forming a picturesque and vivid gallery of human portraits. These are presented without apology or explanation; there are no unnecessary comments or descriptions, for Harte's characters reveal themselves wholly in their words and actions. Often the sorriest specimen of humanity is shown to possess the divine spark of heroism, as in *The Outcasts of Poker Flat,* where a wretched woman, driven out from the town, starves to death that her snow-bound companions may have her portion of food. From a literary standpoint these tales are examples of the highest art.

The author's most popular poem, *Plain Language from Truthful James,* also known as *The Heathen Chinee,* was published in 1870. This often-quoted poem, of which the first stanza appears below, has a breezy humor, vivacity and original touch characteristic of his best verse:

> Which I wish to remark,
> And my language is plain,
> That for ways that are dark
> And for tricks that are vain,
> The heathen Chinee is peculiar,
> Which the same I would rise to explain.

In 1871, after serving for a few months as professor of recent literature in the University of California, Harte went to New York to continue his literary work. For several years after

ave been published, but perhaps the most gh accounts are found in Rendle's *John*

STATUE OF JOHN HARVARD
On the grounds of Harvard University.

ard and Thayer's *History of Middlesex ity.*

sult Shelley's *John Harvard and His Times.*

RVARD UNIVERSITY, the oldest insti- n for higher education in America. It was lished in 1636, only six years after the lation of the colony of Massachusetts Bay ixteen years after the landing of the Pil- s. From its earliest days to the present it has maintained a leadership and prestige ig educational institutions second to none e United States. From it have come many e impulses which have from time to time undly altered the character of higher edu- n; probably the most important of these ges was the introduction of the elective m (see ELECTIVE STUDIES).

t alone in education have Harvard men eminent and influential. From the days ncrease Mather to the present, Harvard have been leaders in all fields, particularly erature and politics. Three Presidents of Jnited States—John Adams, John Quincy ms and Theodore Roosevelt—were Harvard ates, and George Washington received an ary degree from Harvard in 1776. Among well-known names on the roll of gradu- ates are Cotton Mather, Theodore Parker, Ralph Waldo Emerson, Henry D. Thoreau, James Russell Lowell, Oliver Wendell Holmes, George Bancroft, William H. Prescott, John Lothrop Motley, Francis Parkman, Charles Sumner, Edward Everett, Wendell Phillips and Louis Agassiz.

Growth of the University. It was on October 28, 1636, that the general court or assembly of the colony of Massachusetts Bay voted £400 ($2,000) for a "schoale or colledge" to be established at Newtowne. Two years later the name of the town was changed to Cambridge, in honor of the English university, at which about sixty of the leading men of the colony had been educated. Among the number was Rev. JOHN HARVARD, a Puritan minister who died in 1638 and left his library of 260 volumes and half of his estate to the new college. This bequest, amounting to £400 ($2,000) was a princely one for those times, and it was immediately decided to name the institution in his honor. The first class, of nine students, was graduated in 1642.

For many years the college grew slowly but steadily, in spite of internal dissensions. Almost from the beginning there was conflict between the two governing bodies of the university, the corporation and the board of overseers. The corporation, comprising the president, the treasurer and five fellows, was charged with the administration of the college, but many of its acts were subject to the approval of the overseers. The corporation for many years was inclined to be liberal, particularly in matters of religion, while the overseers, half of whom were Congregational ministers and the other half state officials or laymen chosen by the legislature, were conservative. For years there was a triangular struggle between the colonial or state officials and the strict and the liberal elements among the Congregationalists. During the first half of the nineteenth century the college was the chief stronghold of the Unitarians, and it was not until 1851 that the charter was amended to include no reference to control by any Church. In 1865 the state surrendered its partial control of the university by transferring the election of the overseers from the state legislature to the alumni.

When Charles William Eliot became president in 1869, therefore, the time was ripe for great changes, for the university was free from state and denominational influences. It is noteworthy that Eliot was the first president who was not a minister. In 1869 Harvard included

the *college*, or academic department, and several semi-independent professional schools with no fixed standards of admission. The attendance was between 1,000 and 1,100, and the yearly income was less than $300,000. The elective system had made its appearance in 1825, but the few elective courses offered were not popular and were thought to be of little value. The medical school, founded in 1782, and the law school, founded in 1817, were not yet on a secure basis. When Eliot resigned in 1909 he left a coördinated university, with professional schools open only to college graduates, over 5,000 students in all departments, and an annual income, not including gifts and bequests, of more than $2,000,000. He had also firmly established the system of elective studies, which, in more or less modified form, is now found in almost every college and university in the United States and Canada. In 1869 Harvard was merely a large New England college; to-day it is one of the world's great universities.

Organization of the University. For the purposes of instruction the university is divided into the four faculties of arts and sciences, law, medicine, and divinity, each of which is discussed below:

Arts and Sciences. The faculty of arts and sciences includes the college, or undergraduate department, and the graduate school of arts and sciences, the graduate school of applied science, and the graduate school of business administration. The distinction between graduate and undergraduate work is not very sharply drawn, many of the courses of study being open to both graduates and undergraduates, but only college graduates are admitted as regular students in the three graduate schools. About one half of the university's total of 5,500 to 6,000 students are under the direction of this faculty. Harvard College, the undergraduate department, grants the degrees of Bachelor of Arts (A. B.) and Bachelor of Science (S. B.), the chief difference being that candidates for the degree of S. B. need not offer Latin for admission. Admission to the college is by examination, but certificates of work previously done are taken into consideration of the candidates' eligibility.

Law. The Harvard law school, founded in 1817, is one of the leaders among the law schools in the United States. It was the first law school to adopt the so-called "case method" of teaching law, whereby the students study the application of law in existing court decisions rather than in formal textbooks dealing with abstract principles. The course covers three years.

Medicine. The medical school, like the law school, stands in the front rank of American professional schools. The work required covers four years, and graduates receive the degree of Doctor of Medicine (M. D.). The equipment of the school is of the most modern kind, and the buildings, which are located in Boston, are close to several large hospitals affording facilities for clinics.

The faculty of medicine also controls the Harvard dental school, the only professional department which does not require a collegiate degree for admission. It does, however, require all candidates for admission to pass an examination, through which the standard is kept fairly high.

Divinity. The divinity school was established in 1819 as an Unitarian institution, but is now undenominational, and no religious tests of any kind are prescribed for the students or faculty. In affiliation with it is Andover Theological Seminary (Congregational), formerly located at Andover, Mass., but since 1908 at Cambridge. The courses of study offered by the two schools are arranged to supplement each other.

Affiliated Institutions. In addition to the regular courses during the academic year, the university offers summer courses in nearly all departments. Summer courses are open to women as well as men, whereas the regular courses, except a few of the most advanced ones, are open to men only. The courses in the summer schools, while sometimes corresponding to the regular work, are designed mostly for teachers, and work in the summer school is rewarded by the special degree of *associate*. In affiliation with Harvard are Radcliffe College (which see), for women, and, since 1914, the Massachusetts Institute of Technology (which see). W.F.Z.

Consult Pier's *The Story of Harvard.*

HARVEST MOON, a name given to the full moon that occurs nearest the autumnal equinox, about September 21. It rises about the same time for several successive nights, shining with such a brilliant light that farmers in Northern latitudes are able to work in the harvest fields until late at night. The harvest moon shines much more brightly in Northern Europe and Canada than in the United States, because the "orb of night" is then traveling at its least possible angle with the ecliptic (which

see). The harvest moon in the Southern Hemisphere occurs in March, at the vernal equinox. The beauty of the harvest moon has been celebrated in painting and in poetry. Longfellow in his *Harvest Moon* describes it in these words:

It is the Harvest Moon! On gilded vanes
And roofs of villages, on woodland crests
And their aerial neighborhoods of nests
Deserted, on the curtained window-panes
Of rooms where children sleep, on country lanes
And harvest fields, its mystic splendor rests.

HARVEY, *hahr'vi,* HORACE (1863-), a Canadian jurist, appointed in 1910 to succeed Hon. Arthur Sifton as chief justice of the supreme court of Alberta. He was born in Elgin County, Ont., and after graduating from the University of Toronto, was called to the bar in 1889. He practiced in Toronto until 1893, when he removed to Calgary. In 1896 he was appointed registrar of land titles at Calgary, and in 1900 became deputy attorney-general for the Northwest Territories. In June, 1904, he was appointed judge of the superior court of the Territories, and on the organization of the province of Alberta became judge of the supreme court. In 1910 he was appointed chief justice. G.H.L.

HARVEY, SIR JOHN (1778-1852), British soldier and colonial administrator. After service in many parts of the world he was sent to Canada in 1812 as deputy adjutant-general of the British forces. He became one of Sir George Prevost's chief advisers, and was conspicuous in several battles, particularly at Stoney (or Stony) Creek, where he defeated General Dearborn, and at Crysler's (Chrystler's) Farm. At the close of the war he returned to England, and during the Waterloo campaign served on the staff of the Duke of Wellington. In 1836 he returned to America as governor of Prince Edward Island. He was governor of New Brunswick from 1837 to 1841 and of Nova Scotia from 1846 until his death. Sir John was one of the most popular of the governors who have served in Canada. That this popularity came at the height of the struggle for responsible government, a period when governors were disliked by the people as a matter of principle, is a high tribute to his character. G.H.L.

HARVEY, WILLIAM (1578-1657), an English physician, who by his discovery of the circulation of the blood laid the foundation of modern medicine. This epoch-making discovery, which inaugurated an era of experiment in biology, is more remarkable when one considers that, without the aid of a microscope, Harvey reached conclusions that have stood the test of time. From 1628 on, his time was spent in defending and expounding his doctrine of circulation, for the professors of anatomy of his day disbelieved his theories; and it was not until 1827 that the full truth of his conclusions was substantiated.

He was born at Folkestone, studied at Caius College, Cambridge, and later took his medical degree at the University of Padua. Returning to London in 1602, he became physician of Saint Bartholomew's Hospital, and then lecturer at the College of Physicians there. He was later appointed physician to James I and to Charles I. His treatise, *Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus* (On the Movement of the Heart and Blood in Animals), which expressed his views on circulation, is the greatest single essay on a biological or medical subject ever given to the world. See CIRCULATION OF THE BLOOD.

HARZ, *hahrts,* **MOUNTAINS,** a range of mountains in Germany, extending for a distance of sixty miles through Prussia, Brunswick and Anhalt, between the rivers Saale and Seine. The highest peak is the Brocken, rising to a height of 3,747 feet, famous for its curious specter, or shadow of spectators thrown by the sun on to the morning and evening mists. Throughout the range the average elevation is not more than 1,000 feet. The lower slopes are covered with valuable timber, including oak, pine and beech, but the mountain tops are quite barren. Granite is the principal rock, having broken through lower strata of Devonian formation (see GEOLOGY). The hills are rich in minerals, including silver, copper, iron and manganese; mines have been worked since the twelfth century and are not yet exhausted. The inhabitants of the Harz Mountain district, which contains the towns of Blankenburg, Klausthal, Goslar and Wernigerode, are skilful in the rearing and training of canaries, which are regarded as the finest songsters in the world. The scenery is beautiful, and for many years the mountains have been visited by great numbers of tourists.

HASHISH, *hash'eesh,* the Oriental name for the tops and tender parts of Indian hemp, the active principle of which is extracted by boiling with water to which butter or oil has been added, thus forming a fatty substance. In India it is used as a narcotic stimulant, and produces a form of intoxication accompanied by dreams, delusions, extreme drowsiness and

the *college*, or academic department, and several semi-independent professional schools with no fixed standards of admission. The attendance was between 1,000 and 1,100, and the yearly income was less than $300,000. The elective system had made its appearance in 1825, but the few elective courses offered were not popular and were thought to be of little value. The medical school, founded in 1782, and the law school, founded in 1817, were not yet on a secure basis. When Eliot resigned in 1909 he left a coördinated university, with professional schools open only to college graduates, over 5,000 students in all departments, and an annual income, not including gifts and bequests, of more than $2,000,000. He had also firmly established the system of elective studies, which, in more or less modified form, is now found in almost every college and university in the United States and Canada. In 1869 Harvard was merely a large New England college; to-day it is one of the world's great universities.

Organization of the University. For the purposes of instruction the university is divided into the four faculties of arts and sciences, law, medicine, and divinity, each of which is discussed below:

Arts and Sciences. The faculty of arts and sciences includes the college, or undergraduate department, and the graduate school of arts and sciences, the graduate school of [illegible] ence, and the graduate school of [illegible] ministration. The distinction betw[illegible] and undergraduate work is not [illegible] drawn, many of the courses of stu[illegible] to both graduates and undergrad[illegible] college grad[illegible] are admitted [illegible] dents in th[illegible] graduate school [illegible] half of th[illegible] y's total of [illegible] students a[illegible] direction [illegible] Harvard [illegible] underg[illegible] ment, gra[illegible] es of [illegible] (A. B.) a[illegible] of Sc[illegible] chief diff[illegible] that [illegible] degree of [illegible] ot off[illegible] sion. A[illegible] coll[illegible] tion, bu[illegible] are tak[illegible] eligibili[illegible]

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Medicine. The [illegible] school, stands in [illegible] professional sch[illegible] ers four years, [illegible] of Doctor of [illegible] ment of the [illegible] and the bu[illegible] are close [illegible] facilities [illegible]

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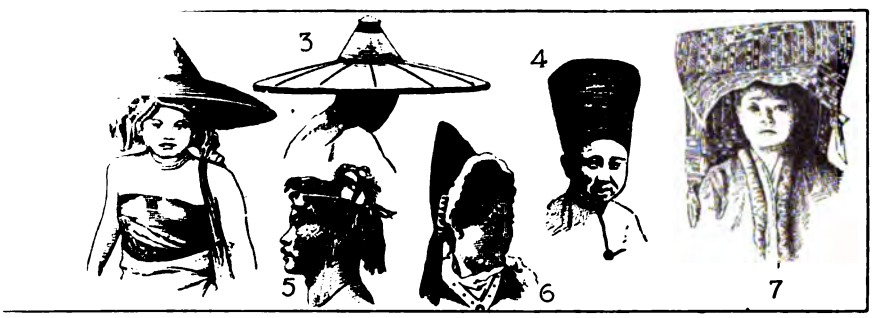
...ats, made of straw, felt, fur or cloth, ...ned in many ways. Fur, feathers, ... and flowers are the principal trim-... varied to meet the requirements of the ...ailing mode. Audubon societies are en-...ged in a crusade to prevail upon women not to wear any part of a bird upon their hats (see AUDUBON SOCIETY). In less civilized countries fashion decrees fewer changes; a certain style of headdress once adopted is held for generations. The women of Sikkim, India, wear an extravagant, turbanlike erection decorated with gold ornaments and precious stones. The Shan girls and many of the coolies of Indo-China wear a huge hat of plaited straw, with a brim like an umbrella and a big cone on the top. The Burmese are partial to a



SOME STYLES IN HATS WHICH SELDOM CHANGE

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Consult Rhead's *Chats on Costume;* Hughes' *Dress Designs.*

sleep. American hemp possesses similar but less pronounced properties. The effect of the drug depends largely upon the individual. Hashish is used as a sedative in place of opium, and has been successfully employed for the relief of neuralgia and headache.

HASTINGS, *hays'tingz,* BATTLE OF, regarded as one of the fifteen decisive conflicts of history, took place on August 14, 1066, at Senlac, near Hastings, between the English under King Harold and the Norman invaders under William of Normandy. Harold had been crowned king, but William laid claim to the throne, and declared that Harold had promised to support his ambition. In this battle, which was the only one fought in the establishment of Norman rule in England, Harold was slain and the English were completely defeated. Thereafter the victor was popularly known as William the Conqueror, and by historians as William I. See FIFTEEN DECISIVE BATTLES; WILLIAM I; HAROLD II.

HASTINGS, NEB., the county seat of Adams County, in the southern part of the state, ninety-seven miles west by south of Lincoln, the state capital. Hastings is a railroad center, and is on the Chicago, Burlington & Quincy; the Missouri Pacific; the Hastings & North Western, and the Saint Joseph & Grand Island lines. The population in 1910 was 9,338; in 1916 it was 11,021, by Federal estimate.

The city contains Hastings College (Presbyterian) and the state asylum for the chronic insane, and has a city hall, Mary Lanning Hospital and several parks. It is surrounded by a fertile agricultural and stock-raising section, and carries on an extensive trade in wheat, corn and live stock. The principal industrial establishments are manufactories of wagons, agricultural implements and flour. Hastings was settled by homesteaders from the East and was first incorporated in 1874.

HASTINGS, WARREN (1732-1818), a British soldier and statesman, and first Governor-General of India. At the age of eighteen he received an appointment in the East India Company's service and went to Bengal. In 1757 he joined Clive and served as a volunteer with distinction in his campaign. In 1761 he became a member of the Bengal council and removed to Calcutta, but returned to England in 1764. Five years later he was sent back to India on government affairs, became a member of the council at Madras, and three years later was made president of the supreme council of Bengal. He was made Governor-General of India in 1774, which position he held for eleven years. He then resigned and returned to England. He was charged with maladministration and the receiving of bribes from the East India Company, and was impeached as a result of Burke's efforts. His trial, one of the most famous in history, began in 1788 and lasted seven years. The most eloquent English advocates, Burke, Fox and Sheridan, were arrayed against him, but the verdict freed him. The following year, 1796, the East India Company settled on him a large annuity.

HAT, a covering for the head, worn for protection and for ornament, and differing from a cap in having a brim. Although it has been customary from the earliest days for men and women to wear head coverings of some kind, the art of hat making is comparatively new. Until about the beginning of the fifteenth century soft caps formed the usual headwear in Europe, except when helmets or military headdresses were worn.

The art of *felting* was introduced into Germany probably from the East, and flourished there for nearly a century before it reached England. As soon as the art was established, about 1510, caps became the headdress of the poorer classes only, while hats were regarded as the exclusive property of the aristocracy. Wool was the first material employed in making felt hats; the fine, soft fur of the beaver came into use when the great fur country of North America was entered. So extensively was beaver fur used that hats were commonly called *beavers.*

Felt-Hat Making. Beaver fur is now so scarce that it is used very little in hat making. Its place has been taken by rabbit, hare and muskrat fur and waste cuttings. All the processes which were formerly performed by hand are now more quickly and economically accomplished by machinery. Fur to be used in felting is first soaked in a solution of nitrate of mercury, after which it is shaved from the skin. The pulpy mass of fur is then pressed into sheets or pieces of the required thickness, which are then molded into hats. The most common form of felt hat is what is called a *Derby* in America and a *Bowler* in England. The Derby was introduced as a fashionable novelty in America in 1874. To make this type of hat, a piece of the pressed felt, which has been previously shrunk by heat, is placed over a mold the shape and size of the hat. Sufficient margin of material is allowed for the brim, which is turned and shaped by a mold

slipped over the crown. While on the block or mold the hat is dyed, stiffened with size, and dried. A Derby is stiffened with a solution of shellac in alcohol. The hat is then removed to another block, on which it receives finishing touches; it is sandpapered to remove any unevenness of surface, the sweatband, lining and trimmings are attached and after a final shaping and testing on the block it is ready for the market.

Silk Hats. The first silk hats were made in Florence, Italy, about 1760. They are tall and stiff, flat on the top, rounded like a stovepipe, and have a satiny luster. In their manufacture silk plush takes the place of beaver fur, which was once used but has become too scarce and costly for the purpose.

SOME STYLES IN HATS WHICH SELDOM CHANGE

(1) Headdress worn in parts of India. (2) Straw hat with cone-shaped crown, worn over a turban; the hat of Shan girls in Burma. (3) Straw hat worn by men in Burma. (4) Turbanlike hat made of strips of cloth, worn by women in parts of Indo-China. (5) A straw cap bound by a metal band constitutes the head covering of the Igorot in the Philippines who has not yet come under the influence of the Americans. (6) Headdress of Swedish girl. (7) The Siamese hill women wear this style of headdress.

The body is now made of calico, stiffened with shellac, the plush being shaped on a block and cemented to the frame of the hat. The brim is made of two or three thicknesses of stiffened calico. The plush is brushed and ironed until it adheres to the frame without creases, the trimmings are added and the hat is ready for use. The machinery used in making silk and Derby hats is of American origin.

Straw Hats. The straw used in modern hats is chiefly grown in Italy, Japan and China, and is exported from those countries in braids which are afterwards wound into the required shapes. Machinery is used for sewing the braids and hydraulic presses are usually employed to fix the shapes. Sizing is used to stiffen the straw, which accounts for the sticky feeling of a straw hat dampened by rain.

Hats of the World. In civilized countries hats vary greatly in shape, size and color, but the materials remain the same year after year. Women's hats, made of straw, felt, fur or cloth, are trimmed in many ways. Fur, feathers, ribbons and flowers are the principal trimmings, varied to meet the requirements of the prevailing mode. Audubon societies are engaged in a crusade to prevail upon women not to wear any part of a bird upon their hats (see AUDUBON SOCIETY). In less civilized countries fashion decrees fewer changes; a certain style of headdress once adopted is held for generations. The women of Sikkim, India, wear an extravagant, turbanlike erection decorated with gold ornaments and precious stones. The Shan girls and many of the coolies of Indo-China wear a huge hat of plaited straw, with a brim like an umbrella and a big cone on the top. The Burmese are partial to a somewhat similarly-shaped hat, although the women usually wear a cloth hat without a brim, shaped like a large fez. The formerly savage Igorrote of the Philippines wears a small "pillbox," made of straw and bound by a metal band. The headdress of the Swedish peasant girls is simply and attractively made of cloth, the color depending on individual taste. In shape it resembles the hood formerly worn on cloaks, and may cover the head when required. The Siamese hill women go to extremes, and wear a huge structure with an erection of lace on a light wooden framework. The headdress of many natives of Africa consists merely of feathers, and the Indians of North America usually wore elaborate coverings of skins decorated with gayly-colored feathers. It is probable that all head covering originated in the desire for ornamentation rather than utility. F.ST.A.

Consult Rhead's *Chats on Costume;* Hughes' *Dress Designs.*

HATTERAS, *hat'er as,* a cape on Hatteras Island, on the coast of North Carolina, the projecting point of a long reef of sand, which storms and shoals make dangerous to navigation. A lighthouse over 190 feet high has a light that flashes every ten seconds, and three-quarters of a mile south there is another steady white light thirty-five feet above the sea. The Gulf Stream flows only twenty miles east of the cape and, in avoiding it, sailing vessels are liable to be driven too near the coast and to founder on the treacherous shoals. A great sea wall parallel with the coast has been projected, behind which safe anchorage will then be afforded for boats, and there will be fewer wrecks along this point of land.

HATTIESBURG, *hat'iz burg,* Miss., one of the largest yellow-pine centers of the South, situated in the southeastern part of the state, in Forrest County, of which it is the county seat, and on the Hastahachee (or Leaf) River. Jackson is ninety miles northwest; New Orleans, La., is 110 miles south, and Mobile, Ala., is 111 miles southeast. Transportation is provided by the New Orleans & North Eastern (Q. & C. Route), the Mississippi Central, the New Orleans, Mobile & Chicago and the Gulf & Ship Island railways, all constructed to the city between 1885 and 1895. Hattiesburg was incorporated as a town in 1884, received its charter in 1899 and was named in honor of "Hattie" Hardy, wife of a railway official. Until January, 1908, it was the "courthouse" of the second district of Perry County. In 1911 the commission form of government was adopted, with a mayor and two commissioners. The area of the city is eleven and one-half square miles. In 1916 its population was estimated by the Census Bureau to be 16,482; in 1910 it was 11,733.

The surrounding country is a rich timber and truck-gardening region, as is suggested by the character of its industries. More than $7,000,000 worth of lumber is manufactured annually in the immediate vicinity of Hattiesburg, one firm employing about 800 people. There are also cotton compresses, foundries, fertilizer plants, oil mills, wood-reduction plants, planing mills, wood-alcohol, canning-syrup and sash-and-door factories. Its notable buildings are a $75,000 Federal building, erected in 1912, and a $50,000 Y. M. C. A. building, completed in 1915. Besides its public school system, the city has a state normal college, South Mississippi Women's College, a business college and a library.

HAULTAIN, *hawl tain',* Frederick William Gordon (1857-), a Canadian statesman and jurist, for many years the foremost Conservative leader in the Northwest and since 1912 chief justice of the province of Saskatchewan. Of English birth, he came to Canada at an early age, and received his schooling at Montreal High School, Peterborough Collegiate Institute and the University of Toronto. He was called to the bar of Ontario in 1882, but two years later removed to the Northwest Territories where he practiced law first at Macleod and after 1887 at Regina. In 1887 he was appointed to the Northwest Council, and from 1888 to 1905 was a member of the Assembly. In 1891 the lieutenant-governor called on him to form the first executive committee of the Northwest Territories, and in 1897, when the committee was displaced by an executive council, Haultain became the first premier, attorney-general and commissioner of education of the Territories. These positions he held until the organization of Saskatchewan as a province in 1905; then he entered the legislature and became leader of the Conservative opposition. G.H.L.

HAULTAIN, Theodore Arnold (1857-), a Canadian man of letters, regarded as one of the most brilliant of contemporary essayists. Haultain was born in India, but went to Canada as a young man and was educated at the University of Toronto. He was for several years editor of the *Educational Weekly* at Toronto, and from 1889 to 1893 was on the staff of the Toronto Public Library. Thereafter he was private secretary to Goldwin Smith until the latter's death in 1910. Among his numerous published volumes are *Memoirs of Goldwin Smith; Goldwin Smith: His Life and Opinions; A Fragmentary Dialogue on Love and Religion; Of Walks and Touring Walks;* and *A Critique of Cardinal Newman's Exposition of the Illative Sense,* regarded by many critics as his best work.

HAUPTMANN, *houpt'mahn,* Gerhart (1862-), popularly considered the greatest German playwright since Goethe. In 1912 the Nobel prize ($37,000) was conferred upon him for his encouragement of idealism in literature. He is the priest of individualism. "Live thy own life!" is his belief. His dramas depict in a marvelously natural manner the maladies of his age and the actions and struggles of the people in everyday life, without offering a theory for the future. Although much of his work seems hard and relentless, underneath is

sounded a note of pity for man's weaknesses as he sees them. *The Sunken Bell, The Weavers* and *Before Sunrise* are among his best plays. He is the author of a volume of poems, *Springtide*, and a book of *Travel Sketches*.

HAVANA, *ha van'a*, or **HABANA**, *hah bah' na*, is the capital and metropolis of the republic of Cuba, and the most important city in the West Indies. It is but ninety miles distant, almost due south, from the city of Key West, Florida, which is connected by rail with the mainland of that state. It is no farther east than Detroit, and is two hundred miles farther west than the city of Panama. For generations it has been visited in the winter season by tourists from North American lands. The harbor, one of the safest in the world, is entered by a narrow channel between Morro Castle, on the east, and the *Punta* on the west. Within this harbor occurred, on February 15, 1898, the mysterious catastrophe by which the *Maine*, a visiting vessel of the United States navy, was destroyed, with many of its men. See SPANISH-AMERICAN WAR.

Havana covers about nine square miles, and contains over 325,000 people. About half of the city is centuries old, and possesses the features of an old Spanish town. The governor's palace and the cathedral, both of which date

MAP OF HAVANA

from 1724, are typical of the period of their construction and possess much interest for the visitor. The newer portion of the city is well-designed, with broad streets, beautiful promenades and drives and picturesque parks, or *plazas*. The houses are low and are built in Spanish style around central courts which are often bowers of tropical beauty. The walls and roofs are sometimes brightly colored, and instead of windows there are fancy wood or iron grills. There are a large number of hotels, clubs and theaters in the city. Among the educational institutions are the University of Havana, the Jesuit College de Belen (Bethlehem), a normal school, a library and museum and numerous minor schools.

Alameda de Paula, along the bay, is a popular promenade. The Prado is a beautiful boulevard ending in Colon Park, the largest in the city. There are fifty or more fountains throughout the city, supplied by an aqueduct, which also furnishes water to residences.

Industries. Cigar and cigarette factories, the largest in the world, are the principal industrial establishments of the city. One of them produces 2,000,000 cigarettes daily. Boxes and barrels, wagons, carriages and machinery are manufactured to some extent. As the chief port of the island, Havana handles a large part of Cuba's commerce. Cigars, tobacco and sugar are the chief exports, and the imports consist principally of foodstuffs and cotton. The lighterage interests of Havana are powerful, and through the absence of wharves, those who make a business of removing the cargoes from vessels are prosperous. It has been estimated that bringing a ton of material to shore at Havana costs about as much as to carry it from Liverpool. About half the imports of Havana come from, and nearly two-thirds of the exports go to, the United States. The foreign trade amounts to about $140,000,000 a year; about $82,000,000 of it is carried in American vessels.

Location of Capital. It was intended at first that the capital city should be on the south coast of Cuba, but in 1519 the plan was changed and the new city was built on the northern harbor, that it might be more easily reached from Europe. The port chosen, with all its beauty and convenience of location, is unfortunately shallow; and in this day of great ships it is a serious disadvantage, alike to travelers and to shippers, to make constant use of lighters to effect a landing.

Many times in its long history has Havana suffered from foreign attacks in the wars of Spain; and in the old days of piracy on the Spanish main it was repeatedly raided by these enemies. M.S.

Consult Rowan and Ramsey's *The Island of Cuba*; Norton's *Complete Handbook to Havana and Cuba*.

HAVELOCK, *hav'lok*, SIR HENRY (1795-1857), a British soldier who will always be

remembered as one of the heroes of the Sepoy Rebellion. He commanded a division of the army invading Persia in 1856, but on receiving news of the outbreak of the mutiny in India he went to Calcutta and quickly organized a force to start from Allahabad to the relief of Cawnpore and Lucknow. After severe fighting he entered Cawnpore to find that the European residents, men, women and children, had been massacred. After many attempts his army, worn by sickness and forced marches, reached Lucknow. Here Havelock and General Outram, who had joined him at Cawnpore, were besieged. The British troops, with a few friendly natives, held off the enemy until relieved by Sir Colin Campbell, in November, 1857. The defense and relief of Lucknow stand out among the most brilliant feats of arms ever achieved by British troops. Havelock died five days after the relief, without knowing that he had been made a baronet and had received other honors. See SEPOY REBELLION.

HAVERHILL, *ha'ver il,* MASS., one of the largest boot-and-shoe manufacturing centers in the world, possessing literary interest also as the birthplace of John G. Whittier. It is situated in the extreme northeastern part of the state, in Essex County, at the head of navigation of the Merrimac River, about eighteen miles from the ocean. Lawrence is nine miles southwest; Lowell, also southwest, is twenty-five miles distant, and Boston is thirty-three miles south. The Boston & Maine Railroad, constructed to the city in 1837, affords railway transportation, and electric lines radiate in all directions. The area of the city is thirty-two square miles. Its population in 1916 was 48,777, by Federal estimate; in 1910 it was 44,115. The city has fifteen parks, of which the largest is Winnikenni Park, covering 214 acres of great natural beauty. A number of small lakes supply an abundance of water.

Buildings and Institutions. The most notable buildings are the high school, erected in 1910 at a cost of $400,000; an $85,000 Elks' Home, built in 1912; a Masonic Temple; Historical Society Building; Y. M. C. A. and Y. W. C. A. buildings, and a Federal building. Supplementing the public school system are the Bradford Academy, for girls, two business colleges and a library.

Industry. From its early days Haverhill has been an industrial city. Its activity in the manufacture of shoes began in 1795, and its annual output is now valued at about $28,000,000; the cut-stock and findings establishments alone have an annual output estimated at $9,600,000. In the combined branches of this industry 15,300 people find employment. One of the largest sole-leather manufactories in the world is also located here. The brick industry, also important, has been carried on in this locality for 200 years, and the manufacture of woolen hats has remained prominent since the beginning of the eighteenth century. The leading woolen mills are the outgrowth of those established in 1835. Besides these commodities the city produces large quantities of wooden and paper boxes, brick, cement and leather.

History. Haverhill was settled in 1640, when its Indian name of *Pentucket* was changed to Haverhill, in honor of the Rev. John Wood, the first minister, whose birthplace was Haverhill, England. The early town suffered severely from the attacks of Indians, the most noteworthy being one in 1698, when Hannah Dustan, with her babe, was captured and taken to New Hampshire, near the city of Penacook. With the assistance of two other captives she scalped a number of the Indians and escaped to Haverhill. A monument to her memory has been erected in one of the parks. A fire in 1873 destroyed thirty-five business houses, and one in 1882 almost totally destroyed the shoe-manufacturing district, the loss being estimated at $2,000,000. John Greenleaf Whittier lived in Haverhill until 1836, and was a student at Haverhill Academy. The city was incorporated in 1869. Bradford, a residential town on the opposite side of the river, with connection by a bridge, was included in the city in 1897. In 1908 the commission form of government was adopted. D.N.C.

HAVRE, *hah'ver,* is, next to Marseilles, the most important seaport of France. It is in the department of Seine Inferieure, 108 miles northwest of Paris, excellently situated at the mouth of the River Seine, with good railroad and water communications with the interior and a harbor that can accommodate 500 seagoing vessels. The entrance to the harbor is only about 300 feet wide, and is protected by strong forts; the basin is divided into nine sections, with more than eight miles of docks. Havre has important industries and manufactures of machinery, cotton goods, chemicals, sugar and glass, and there are also large plants engaged in making heavy guns and building battleships. Most of the commerce is carried on in normal times with the United States, Great Britain and Germany, great quantities of cotton and other produce being imported.

Havre was declared the temporary capital of Belgium on October 13, 1914, the government officials having been driven from their own country by the German occupation of Brussels, Antwerp and Ostend during the early months of the War of the Nations. The city was founded in 1517 and has on five occasions been bombarded by British fleets. Napoleon took great interest in Havre and greatly improved its harbor and defenses, which owed their origin to Richelieu, Louis XIV and Louis XVI. Population in 1911, 136,159.

HAWAII, *hah wi'e,* or **HAWAIIAN,** ***hah wi'an,*** **ISLANDS,** a chain of beautiful, mountainous islands near the middle of the Pacific Ocean. They are widely known for their mild, pleasant climate, for the production of sugar cane per acre exceeding that of any other spot in the world, and as the home of much of the pineapple crop. The islands belong to the United States, and are politically known as the TERRITORY OF HAWAII. They were formerly known as the *Sandwich Islands,* a name given them by Captain James Cook, in honor of the English Lord Sandwich.

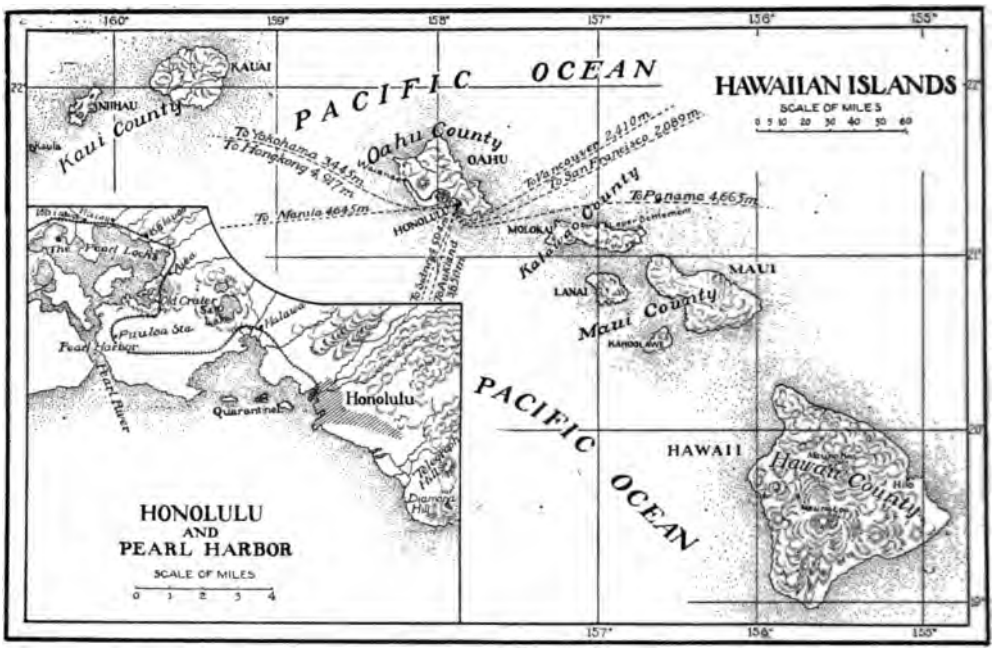
These islands stretch out in almost single file from southeast to northwest for over 400 miles, and lie a little over a thousand miles north of the equator. Eight of the islands are inhabited. The other twelve are uninhabited rocks and reefs, valued by sportsmen as shark-fishing grounds and visited occasionally by natives for eggs of sea birds. The capital city, Honolulu, which is about 100 miles northwest of the center of the group of eight islands, is from 2,100 to 5,000 miles distant from the important Pacific Ocean seaports—those of Alaska at the north and New Zealand at the south, of the Americas at the east, and Asia, the Philippine Islands and Australia at the west. One of the accompanying maps shows these distances. The total area of the inhabited islands is estimated at between 6,000 and 7,000 square miles, and is thus about equal to that of Connecticut and Rhode Island together. The population in 1914 was 208,000, or only one-eighth that of the states named.

Hawaii, the largest of the group, is remarkable for its lofty volcanoes; *Maui,* next in size, is a spot of tropical beauty; *Kahoolawe,* lying south of Maui, is the smallest of the group and had but two inhabitants in 1914; *Lanai* is about twice the size of the last named; *Molokai* is famous as the location of a leper settlement; *Oahu,* the third largest, but the most thickly populated, is the wealthiest and most frequently visited of the islands, for it contains Honolulu, the beautiful seaport capital; *Kauai* is irregularly circular in form, well-watered everywhere and is called the *garden isle; Niihau* is the westernmost of the inhabited islands.

The People. The population of Hawaii is exceedingly mixed. The native islanders are people of moderate size, with skin resembling tarnished copper. Their heads are short and broad, and they have dark brown or black hair, either straight, wavy or curly. Their eyes are expressive and large, and they have flattened noses, thick lips and finely-shaped, pearly-white teeth. Most of these people are quite fleshy, due principally to a vegetable diet. Their language is soft and full of harmony, consisting chiefly of vowels, and they are a race of sweet singers. They are intelligent but leisure-loving, are fond of riding, and delight in the water. Surf-riding is one of their most interesting and exciting sports.

Although the men and some of the women wear clothing of American fashion, a costume very generally worn by women of all nationalities in the islands is a loose Mother Hubbardlike robe known as a *holoku,* which is at least cool and comfortable, if not especially attractive. A pleasing custom of the hospitable Hawaiians is the decorating of arriving or departing friends with gay garlands of flowers called *leise.*

The pure Hawaiian population of the islands is rapidly dying out, owing to diseases and changes in mode of life introduced by foreigners. In 1914 only one-eighth of the people



were pure Hawaiians, and one-fifteenth were part Hawaiians. The Japanese then formed the largest part of the population, numbering 90,000. Besides those there were 23,000 Portuguese, 21,000 Chinese, 15,000 Americans, British, Germans and Russians, and about 15,000 Filipinos. Immigration of Japanese and Chinese has been prohibited, however, and Filipinos are being brought in to furnish the much-needed labor.

Although luxurious modern dwellings are common in the cities, the homes of natives are of rough wood or are grass-thatched huts. Bananas, sweet potatoes, yams, breadfruit and cocoanuts constitute a large part of Hawaiian diet; the national dish, called *poi,* is made from the root of the colocasia.

Language and Religion. In a population so mixed, both language and religion are naturally varied. English is the official language and is taught in the schools. Early missionaries succeeded in bringing Christianity to the native Hawaiians. The Chinese and Japanese generally hold to their Oriental religion, and the language of their home lands is commonly heard. The Portuguese are mostly Roman Catholic, and about half of the entire population is Protestant.

The Land. These islands are the tops of large volcanic cones which have been raised from the ocean bottom. Through the ages those busy little builders, the coral insects, have edged most of the islands with reefs, but none is entirely coral-reef encircled. All of the islands are mountainous, but only Hawaii is actively volcanic. That island has two of the largest craters in the world, Mauna Kea, which is easily ascended and is 13,805 feet high, and Mauna Loa, 13,675 feet high. On the eastern slope of Mauna Loa is the far-famed Kilauea, the most active volcano in the world. Most of the islands, especially Kauai, are cut into deep ravines, gorges and picturesque crags. Here and there the coasts are rocky, and in such places they present to the sea bold cliffs 100 to 1,000 or more feet high, which extend for several miles. In other spots the coasts are sandy beaches and coral reefs. Between the inland mountains and the coasts extend fertile plains and valleys, where agriculture is extensively carried on. Hawaiian rivers are chiefly small mountain torrents.

In 1916 Congress made the wonderful Kilauea region into a national park.

Although naked lava fields occur, especially on the island of Hawaii, ferns and flowering plants abound, and many spots are luxurious riots of tropical verdure and color. Fruit-growing trees and shrubs are plentiful and economically important grasses abound. Large upland areas are covered with forests of tropical trees, such as the *koa,* the candle-nut and the *ohia,* or mountain apple, whose wood is valuable for the manufacture of furniture,

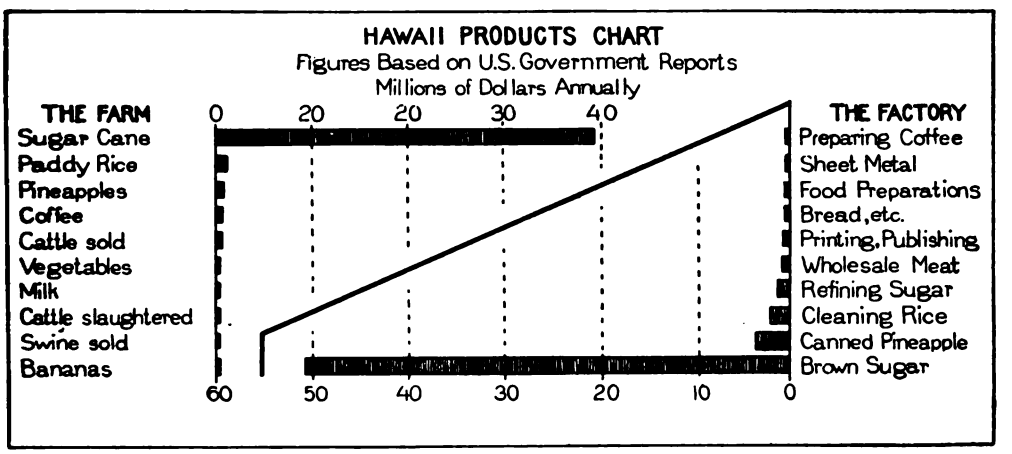
canoes, posts and railway ties. One of the most charming features of the landscape is the profusion of tall palm trees which have been compared to "feather dusters struck by lightning" or to a "grove of damaged umbrellas."

Hogs, dogs and rats have been introduced on the islands, but about the only mammals native to the country are whales, dolphins and a day-flying bat. There are very few snakes and only a few lizards. Fish of various hues and beautifully colored birds abound. Insects are numerous, and in many localities mosquitoes, wasps, cockroaches, locusts and white ants are pests.

Climate. The Hawaiian Islands possess an even, healthful climate, moderate the year round, rarely too warm and never cold. Owing to the trade winds and sea breezes the mean temperature is about 10° cooler than that of other countries in the same latitude. The average temperatures of the lowlands are 70° in January and 78° in July, the extremes being 89° and 54°. In December, when the greater part of North America is snow-bound and swept by icy winds, Honolulu gardens, fields and mountain sides are bright with flowers and gay with the warble of birds under a smiling summer sky. Frost and snow occur on mountain peaks, some being snow-capped throughout the year. Hurricanes are unknown.

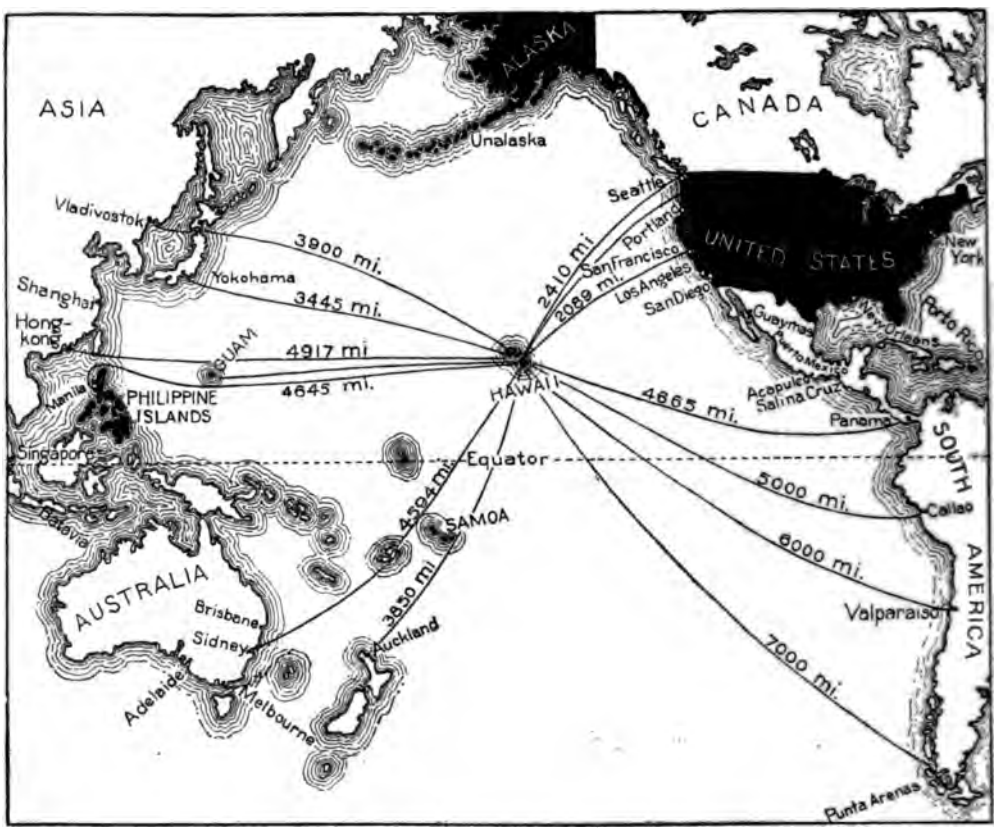
The rainfall and humidity vary in each little locality. Above Hilo Bay, in Eastern Hawaii, the rainfall is nearly as heavy as in any other part of the world, from 100 to 250 inches yearly; at Honolulu it averages about thirty-two inches. Irrigation is necessary, however, in many agricultural districts, especially on the island of Hawaii. Water is pumped from artificial wells, or surface water is conducted through ditches and tunnels. Hawaii's system of irrigation by means of *cane-flumes* excites the wonder of the engineering world.

Industries. The most important industries of the islands are those relating to agriculture. Hawaii, Maui and Oahu, especially, contain large tracts of fertile land, and climate conditions are favorable to the pursuit of agricultural industries. Not many products have been cultivated on a sufficient scale for large quantity export, however, owing to distance from markets of the world, tariffs and lack of practical agricultural knowledge. Scientific studies instituted in recent years by the United States Department of Agriculture have resulted in considerable progress, and since 1900 the value of the sugar crops has more than doubled.



Sugar is grown in the lowlands, and about half the sugar cane plantations are irrigated. Scientific cultivation of that crop has resulted in a greater yield per acre than anywhere else in the world. In 1915 the export of raw sugar to the United States had the record value of $51,368,995, and refined sugar of over $1,500,000. Over half the population is engaged in the sugar industry, and scarcity of labor has necessitated importation of foreign laborers.

Next to sugar in importance comes rice. It is grown in the lowest flats and is cultivated mainly by the Chinese. Most of this product is used in the islands, but a small quantity is exported to the United States. Coffee is cultivated to a small extent for island use. Tobacco and cotton industries are developing, rubber trees are being successfully planted, and a promising new industry is the raising of Bermuda onions.



DISTANCES FROM HONOLULU TO OTHER PORTS
The land masses shown in black are the United States and its Pacific possessions.

Pineapple growing has become an important industry. Canned pineapples and bottled pineapple juice from Hawaii have found a large market in the United States. The export of canned pineapple to the United States is valued at from $4,000,000 to $6,000,000 a year. Bananas, limes, oranges and breadfruit are also grown.

Although most of the meat raised is used on the islands, the live-stock industry is important, for pasturage is good in the uplands. Sisal hemp is being successfully grown, and will soon compete with the great Yucatan yield. Various grasses are used in the manufacture of beautiful mats and Panama hats.

Most of the manufacturing industries are those for the production of sugar, the polishing of rice, cleaning of coffee, canning of pineapples and bottling of pineapple juice. Lack of labor is the principal drawback to the growth of all industries.

Mineral Resources. Although no important mineral deposits have been discovered on the islands, many minerals have been found which might repay development. Sulphur, gypsum, kaolin and mineral paints are abundant. The gathering of sea salt has become a local industry in some places. Pearls have been found, but no commercially important pearl industry has been established.

Transportation and Communication. Good wagon roads have been constructed in the islands, and there are about 300 miles of railway, with new lines projected. The principal railways are on the islands of Oahu and Hawaii. The only street railway is an exceptionally fine one in the city of Honolulu. An inter-island navigation company provides communication between the different islands. Ten lines of steamers connect the islands with the United States, Mexico, Canada, Japan, China, the Philippines and Australia, and Hawaii is a point of call for all transpacific traffic. The opening of the Panama Canal has effected more speedy water communication with Eastern America and Europe.

The Honolulu port has been dredged and enlarged to admit the largest steamers, and wharfage accommodations at that point have been increased. As the city of Hilo, in Eastern Hawaii, is an important sugar shipping point, the construction of a large breakwater at Hilo Bay has been found desirable. A breakwater

A HAWAIIAN PINEAPPLE FIELD
See, also, the article PINEAPPLE.

has also been constructed at Kohuhui, the principal port of the island of Maui, and a harbor for that point will be completed before 1920.

Extensive improvements have been made by the United States government at Pearl Harbor, near Honolulu, for that harbor is a United States naval station. A glance at the map on page 2720, which indicates the position of the Hawaiian Islands in relation to other world powers, will show that the completion of improvements at Pearl Harbor will make it one of the most important naval stations belonging to the United States government. It will be one of the safest and most attractive naval harbors in the world. Improvement of all harbors will increase the commerce of the territory.

Hawaii is connected by cable with both Pacific shores. Wireless telegraphy affords inter-island and Pacific coast communication; in 1915 a wireless message was sent from the naval wireless station at Arlington, opposite the city of Washington, to Honolulu. There are telephones on the five largest islands, and the city of Honolulu is electric lighted.

Cities. The principal cities are the seaport-capital, Honolulu, on the island of Oahu, where more than one-fourth of the entire population is concentrated, and beautiful Hilo, on the eastern coast of Hawaii.

Education. Schools have existed in the islands since 1820, when several were established by early missionaries. Four years later 2,000 people had learned to read, and a general school system extended over the islands which has been gaining strength continually. School attendance is now compulsory for all children between the ages of six and seventeen, at either a public or a private school. Education in public schools is free. Because of the mixed population, pupils of many different nationalities attend the same school. In 1914 there were about 200 public schools, with an attendance of nearly 27,000. At Honolulu there are a high school, a normal school and a college of agriculture and mechanic arts, as well as an industrial reformatory for boys and one for girls. Oahu College is well equipped and endowed and offers higher education. There is a seminary on the island of Maui.

Institutions. In addition to the two reform schools mentioned there is a state prison at Honolulu, as well as a leper hospital and homes for nonleprous boys and girls of leprous parents. On a low peninsula extending north near the center of the island of Molokai, and separated from the mainland by a rock wall 2,000 feet high, is located a famous leper settlement. It is the principal public charity of the territory and the people there receive the very best of care.

Government. As a territory of the United States since 1900, Hawaii has a government similar to that of other organized territories of the United States (see TERRITORY). A governor and a secretary are vested with executive power, and are appointed by the President of the United States for a term of four years. A legislature of two houses consists of a senate of fifteen members elected for four years, and a house of representatives of thirty members elected for two years. Sessions are held every two years and are limited to sixty days. A delegate elected every two years represents the territory in the United States House of Representatives (see DELEGATE).

SEAL OF THE TERRITORY

History. Not much is known of the history of the islands before their discovery by Captain James Cook in 1778, although Gaetano is said to have first seen them, in 1542 or 1555.

Captain Cook lost his life in a conflict with the natives in 1779. At that time each island had a king, but in 1790 Kamehameha I by force of arms formed them into one kingdom under his rule. When he died in 1819, his son, Liholiho, succeeded him, with the title of Kamehameha II. His reign was famous for the abolition of idolatry and of the system of taboo. American missionaries visiting the islands in 1820 were well received, as the king saw the necessity of introducing a religion to replace the one which he had abolished. In 1823 Kamehameha II and his queen visited England, and both died there in 1824.

The widow of Kamehameha I then gained power and ruled for nine years, when the younger brother of the last king, reaching his majority, ascended the throne. Kamehameha III granted a constitution providing for a government consisting of a king, an assembly of nobles and a representative council. The independence of the Hawaiian kingdom was formally guaranteed by the French and English governments in 1843. Kamehameha IV (1854-1863) promoted the principles of civilization, and during the reign of his brother, Kamehameha V, foreign commerce and local business prospered. With the death of the latter in 1873, the line of Kamehamehas became extinct. A series of short, troubled reigns ensued until, with the reign of Queen Liliuokalani matters reached a crisis. She ascended the throne in 1891. It immediately became evident that she intended to rule without a constitution. Headed by the progressive party, a revolution broke out and the queen was deposed. A provisional government was then formed, and as overtures for annexation to the United States were not favorably received, owing in large measure to the opposition of President Grover Cleveland, the Republic of Hawaii was proclaimed on July 4, 1894. A constitution modeled after that of the United States was adopted.

After repeated efforts to annex the islands, Sanford B. Dole, the President of Hawaii in 1898, visited Washington in the interest of annexation. In July, 1898, President McKinley signed a joint resolution passed by Congress, in accordance with which he appointed a commission to visit the islands and map out a plan of government. A month later the United States took formal possession of the islands. In April, 1900, an act of Congress made provision for a territorial government, and Dole, the former president of the republic, was made

Outline and Questions on Hawaii

I. Location and Size

(1) Central position in Pacific
(2) Number of islands
(3) Area of inhabited islands
(4) Comparative size of islands

II. Physical Features and Climate

(1) Volcanic origin
(2) Present-day volcanoes
(3) Short, rapid rivers
(4) Character of coast line
(5) Moderate climate
(6) Rainfall

III. People

(1) Population
(2) Mixed character of population
(3) Language
(4) Religion and education

IV. Industries and Transportation

(1) Agriculture
(2) Comparatively unimportant manufactures
(3) Mining
(4) Railways—300 miles
(5) Harbors and steamship lines

V. History and Government

(1) Discovery and exploration
(2) Growth under Kamehamehas
(3) Period of revolution
(4) Annexation to United States
(5) Government as a territory

Questions

What language is taught in the schools?

What naval station has the United States in the islands?

What is *poi?*

How many street railways are there in the islands?

What is the ordinary dress of a Hawaiian woman?

What has been the effect on the banks of annexation to the United States?

Why was the last queen deposed?

What famous settlement is there on Molokai?

What unique system of irrigation is there on the islands?

What famous explorer lost his life in the Hawaiian Islands?

What are Hawaii's "groves of damaged umbrellas?"

How are the islands represented in the United States legislature?

What did Captain Cook call Hawaii?

What is the most active volcano in the world? Describe it.

governor. Since that time Hawaii has been **increasingly** prosperous. Deposits in banks **have** trebled and those in savings banks have **quadrupled.** The assessed value of property **has** increased one-half, and the value of the **sugar** crop has more than doubled. C.H.H.

Consult Wade's *Our Little Hawaiian Cousin;* **Taylor's** *Vacation Days in Hawaii and Japan;* **Goodrich's** *The Coming Hawaii.*

Related Subjects. The following articles in **these** volumes give additional information on **subjects** connected with Hawaii:

Cook, James	Molokai
Dole, Sanford B.	Oahu
Honolulu	Palm
Kanakas	Pineapple
Kilauea	Rice
Liliuokalani	Sisal Hemp
Mauna Kea	Sugar
Mauna Loa	Taboo

knees they close tightly and will not open until the legs are straightened. In this way hawks obtain a tight hold on their prey. They live chiefly on insects, snakes and small animals, such as field mice and ground squirrels. Some species also kill birds and poultry, but scientific investigations have shown that many species of hawk which are being killed by farmers as pests are really important helpers in keeping down the numbers of insects and animals which are injurious to crops. Bulletins have been issued by the government to aid farmers in recognizing their hawk friends and enemies, and these may be obtained by writing to the Department of Agriculture.

Most hawks build rough nests high in trees, but some live in bushes. According to species, two to six eggs are laid. Downy, helpless young

THREE OF THE HAWKS
(*a*) American sparrow hawk; (*b*) red-shouldered (chicken) hawk; (*c*) marsh hawk.

HAWK, a general name applied rather indefinitely to a large number of birds of prey found all over the world. They are distinguished from owls and vultures by their habit of feeding during the day and by not being carrion eaters. When used by falconers they are called *ignoble* birds of prey, for, though resembling true falcons, they are less powerful, have shorter wings and longer legs, and their beaks are not notched or toothed. See FALCON; OWL; VULTURE.

General Characteristics. Hawks vary in size from ten to twenty-two inches in the males, and from twelve to twenty-four inches in the females. The mother hawk is usually larger, stronger and more bold than the father, for upon her is imposed most of the care of the young. The bills are strong, sharply curved, and fitted for tearing. The claws, or talons, are so constructed that when the legs bend at the

are hatched in about four weeks, and they stay in the nest until they are able to fly. Hawks are devoted parents as well as true lovers, and most of them remain mated for life. Young hawks are usually more darkly colored than mature birds and are more or less striped or spotted beneath.

Species. Of American hawks, the following are comparatively harmless, and should be spared for duty in the fields in removing destructive pests: the large, slow, gray and white *marsh hawk;* the *red-tailed* and *red-shouldered hawks* of Eastern and Central North America, frequently and unjustly called hen and chicken hawks; the dusky-brown *Swainson's hawk* or *buzzard,* common throughout Western America; the *brood-winged hawk,* the hawk of wild and mountainous regions; the large, dark *rough-legged hawk* of the United States, Canada and Alaska.

Among the really villainous hawks are the *goshawk* and *sparrow hawk,* both fully described under their titles in these volumes. Others which are also more fond of poultry and game birds than of insects and animals are the large *Cooper's hawk;* the smaller *sharp-shinned hawk,* or *little blue darter;* the large, princely *duck hawk,* or true falcon, and the bluish *pigeon hawk.* The *fish hawk,* or American *osprey,* is an interesting species more fully described elsewhere. See FISH HAWK; KITE.

HAWKESBURY, *hawks'ber i,* the county town of Prescott County, Ontario, situated on the Ottawa River in the extreme northeastern part of the province. Ottawa is sixty miles southwest, and Montreal is sixty miles east. Railway transportation is provided by the Grand Trunk and the Canadian Northern railways. The town has large lumber, pulp and paper mills; one of the largest sulphite paper mills in the British Empire is located here. Hawkesbury was incorporated as a town in 1896. In 1911 its population was 4,400; in 1916 it was estimated at 4,500. French-Canadians comprise four-fifths of this number.

HAWKINS, *hawk'inz,* ANTHONY HOPE (1863-), an English author who captured the fancy and imagination of a great circle of readers by his novel, *The Prisoner of Zenda.* He is a graduate of Balliol College, Oxford, and after leaving school was admitted to the bar. His first book, *A Man of Mark,* appeared under the pen name ANTHONY HOPE. His *Dolly Dialogues* is a bright seesaw of smart dialogue which appeals to the frivolous side of the reader. His stories are famous for a lusty, animated style, and a number of his books have been dramatized. His works include *Father Stafford, Mr. Witt's Widow, Sport Royal, Rupert of Hentzau, Phroso, The Heart of Princess Osra* and *Double Harness.*

HAWKINS, or **HAWKYNS,** SIR JOHN (1532-1595), a British admiral, whose early training was received in his family of sailors and owners of sea vessels. He took a very active part in adventure on the seas at the beginning of the great epoch of Elizabethan maritime enterprise by sailing to the coast of Guinea, where he robbed the Portuguese slave-trading vessels, then smuggled the captured negroes into the Spanish possessions of the New World. Two other successful expeditions brought him renown, and he was given a coat of arms with a negro, chained, as his crest. He was elected a member of Parliament, and was given the office of treasurer and comptroller of the royal navy, and as a reward for his valor in the conflict with the Spanish Armada in 1588 he was knighted by Queen Elizabeth. In 1595 he accompanied Drake on an unsuccessful voyage to the West Indies in search of treasure, and he died at sea, off Porto Rico.

His son, SIR RICHARD HAWKINS (about 1562-1622), also won distinction on the sea. Like his father, he commanded a vessel in the successful fight against the Armada, and later he set forth on a voyage around the world, with the openly-avowed intention of inflicting all the harm he could on Spanish ships and Spanish colonies. In 1594, however, he encountered a greatly superior Spanish force and was defeated and captured. Not until 1602 was he allowed to return to England.

HAWK MOTH, a long-winged, stout-bodied moth, which flies at twilight. Often, when it hangs over a blossom sipping nectar and keeping itself afloat by the rapid motion of its wings, it is mistaken for a humming bird, and it is commonly called the *humming-bird moth.*

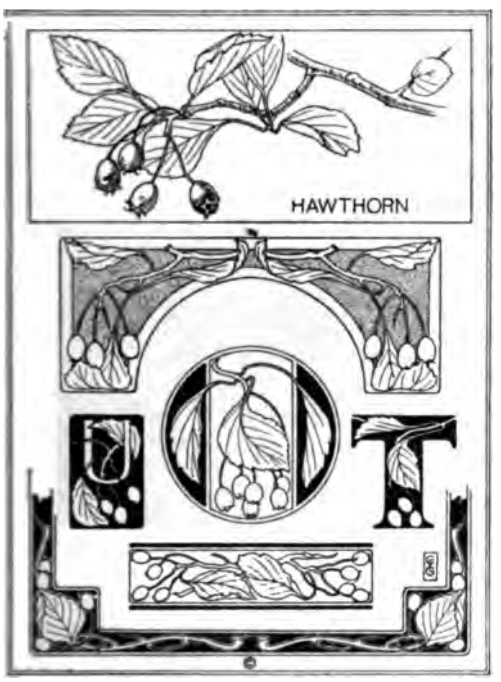
HAW'THORN, a thorny, ornamental shrub or small tree, of dense, low growth, with handsome foliage which turns to a brilliant color in the fall. It bears white, fragrant blossoms, and in some varieties pink or red. It is used extensively in England for hedges. The Greek name

THE HAWTHORN
Form of the tree, as seen in winter; leaves, flowers and berries.

for hawthorn, *kratos,* meaning *strength,* refers to the hardiness of the wood. It bears small, round, red fruit, called *haws,* which ripen in the autumn and which are sometimes used for making jelly. The American red haw, or thorn apple, belongs to the true hawthorn genus.

James Thomson, in his poem *Spring*, gives a pretty description of a forest when the hawthorn is putting forth its blossoms:

The hawthorn whitens; and the juicy groves
Put forth their buds, unfolding by degrees,
Till the whole leafy forest stands displayed
In full luxuriance, to the sighing gales.



FOR A BOOKLET

The illustration shows parts of a cover border, initial letters and ornamentation for pages.

HAW'THORNE, NATHANIEL (1804-1864), the greatest fiction writer that America has produced. Few authors have been able to read more clearly the true inner meaning of men's lives, and the Puritan New England of his day is vividly portrayed in his romances. He was not, in the modern sense of the word, a "realist"—that is, he did not picture detailed happenings and everyday surroundings merely for the purpose of producing an accurate mental photograph. Close observer as he was, he saw that there was something back of the things which could be seen and felt, and that this was the only part of life that really counted. His romances, therefore, are of a spiritual character, and his adventures are the adventures of men's souls.

NATHANIEL HAWTHORNE

Early Life. Hawthorne was born on July 4, 1804, at Salem, Mass., of a family which had numbered among its members soldiers and sailors, but never, until the coming of Nathaniel, a dreamer and a writer of tales. His father died when the boy was but four years old, and his mother's grief was so great that he seems to have felt its shadow, even in his early years. Little attempt was made to give him formal schooling, but he read widely and with keen appreciation, delighting especially in *Pilgrim's Progress*, the *Faërie Queene*, Shakespeare's dramas and Milton's poems. Better even than his books, however, he loved his long, solitary rambles, and after he removed with his mother to Lake Sebago, Me., his love for solitude increased. In his later life he much regretted this tendency, but at this time he knew no joy so great as roaming the unbroken forests with his gun, or skating upon the lake in the moonlight.

In 1821 he went to Bowdoin College, where he had as fellow students Longfellow and

"WAYSIDE"

Franklin Pierce. His college work showed no special genius, nor does it seem to have awakened in him the desire for any specific occupation. Returning, in 1825, to Salem, he settled into the seclusion which he loved, and for twelve years the world heard nothing of him. He wrote much, but little passed the severe critic to whom he subjected it—himself. Occasionally articles from his pen appeared in periodicals, and in 1837 these were reprinted in a little volume called *Twice-Told Tales*. This was not eagerly greeted as the first work of a

new genius; on the contrary, it was almost neglected, despite Longfellow's enthusiastic praise. Since it, with his other literary ventures, did not bring in enough to support him, he served for two years (1839-1841) as weigher in the Boston customhouse. To readers of to-day there is something incongruous, almost sacrilegious, in the thought of the author of *The Scarlet Letter* weighing out coal and grain; but those about him seem to have accepted it as a matter of course.

Growing Reputation. For a year Hawthorne lived at Brook Farm (which see), but he loved solitude too well to find communistic life attractive, and it was with real happiness that he settled down in 1842 in the "Old Manse" at Concord with his wife, Sophia Peabody. The returns from his books, which by this time included *Grandfather's Chair* and *Mosses from an Old Manse*, in addition to the *Tales*, were still small, and in 1846 he accepted the post of surveyor in the customhouse of Salem.

During the three years he held that office he wrote almost nothing, but his mind was busy, so when a change in political parties removed him from office he was ready to begin at once on *The Scarlet Letter*, a tale of austere colonial times in New England. Its publication made him famous not only in his own country but in Europe, and he needed to seek no more customhouse positions. All his works

"THE OLD MANSE"

that followed—*The House of the Seven Gables*, *The Blithedale Romance*, *The Marble Faun* and others—were eagerly read, and he was far more sought after than he desired to be. The last-named book, a curious, weird study of life in the American artist colony at Rome, was the outgrowth of his European experience; for in 1853 he was sent by his former college mate, President Pierce, as consul to Liverpool, and after five years of residence there he went for a year and a half to Italy. After his return to the United States he brought out but one book, which, under the title of *Our Old Home*, gave his impressions of England. *The Dolliver Romance*, *Dr. Grimshawe's Secret* and *Septimius Felton* were left unfinished at his death, which occurred on May 18, 1864, at Plymouth, N. H., while he was traveling with Ex-President Pierce.

Despite his shyness and what he called his "cursed habit of solitude" he had made many friends, for his handsome face and manly bearing attracted all who met him, while his modesty and the strength that was evident through his gentleness won him lasting admiration and respect. As for his works, their reputation has grown with the years, for his mastery of the intricacies of human nature is no more remarkable than is his style, which is easy, delicate and exquisitely pure.

Julian Hawthorne (1846-), the son of Nathaniel, is also a novelist, but while his works show a certain strength and facility they are not productions of genius like those of his father. He was born in Boston, studied at Harvard, and then took up civil engineering, for which, however, his liking was slight. After 1871 he gave up all his time to literature, publishing the novels *Bressant*, *Sebastian Strome*, *A Fool of Nature* and *Noble Blood*, and a life of his father and mother. In 1913 Hawthorne, with others, was tried for alleged misuse of the mails in promoting mining ventures, and while it was recognized that he had been drawn into the transactions by others, he was found guilty and sent to the Federal prison at Atlanta. Of his experiences there he wrote in *The Subterranean Brotherhood*.

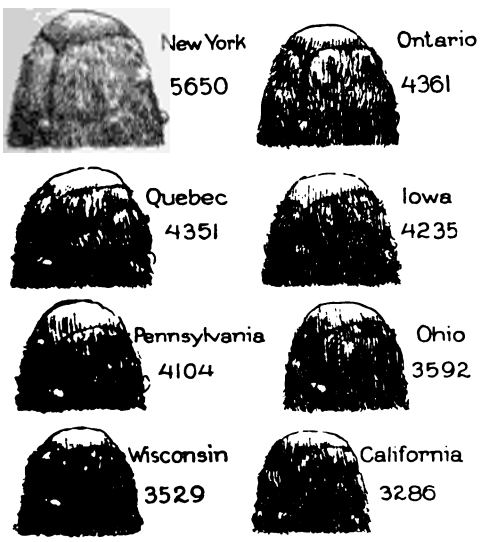
A.MC C.

Consult *Hawthorne and His Circle*, by his son; Brownell's *American Prose Masters*; Woodberry's *Nathaniel Hawthorne*.

HAY, a name given to a number of crops dried for use as food for cattle and horses. The chief plants cultivated for this purpose are timothy and other grasses, alfalfa, clover, rye, barley and oats. Buffalo and prairie grasses are cut and cured in many localities. In all cases hay should be cut before the seed is completely ripened, as the food value is then greatest. The crop, when cut, is allowed to lie on the ground until sufficiently dry to store. The time taken for drying depends on the climate; where heavy dews fall or rain is expected the hay is collected each evening into mounds or haycocks. If it is very damp it may be spread

out again in the morning. The operations of cutting, raking and stacking are now generally performed by machinery. Hay is often stacked out-of-doors, the stack being covered with a thick thatch of straw, arranged in the shape of a cone, to keep out the rain. More frequently it is put into hay barns or lofts.

Fresh cut hay should not be fed to horses or cattle, as it is too relaxing. It is better kept in the stack until it has undergone a sweating



WHERE MOST OF THE HAY IS PRODUCED

process and has cooled again. If stored too green the sweating is liable to generate such heat that the hay becomes scorched and useless. Hay may be fed whole or cut, and it is an excellent winter feed. For hard-worked horses chopped hay with added meal is good, but no farm stock should be fed entirely on hay, whether from grass, alfalfa or cereals; some grain food is always necessary. Hay made from clover and alfalfa is rich in strength-building protein and is much more nutritious than timothy or Kentucky blue-grass hay. For shipping purposes, hay is baled by machinery and is readily handled. It requires less than one-third the space needed for loose hay, and for this reason many farmers would find it cheaper to buy baled hay or have their own loose hay baled than to build a large barn. Another advantage of baled hay is that it will not burn.

In the United States the crop of timothy and clover mixed averages yearly about 35,000,000 tons, valued at over $357,000,000, or $10.40 per ton. Timothy alone comes next, with a production of nearly 18,000,000 tons, valued at an average of $188,000,000, or $10.46 per ton; alfalfa, 12,000,000 tons, worth $93,100,000, or $7.85 per ton; while buffalo and other prairie grasses are valued at $91,000,000, or $4.95 per ton, the production averaging 18,375,000 tons. The average yield per acre is usually as follows: timothy and clover mixed, 1.27 tons; timothy alone, 1.22 tons; alfalfa, 2.52 tons; wild grasses, 1.07 tons. In Canada the yield of hay and clover for the year 1914 was estimated at 10,259,000 tons, valued at $145,999,000, or an average of $14.23 per ton. The alfalfa crop was 218,360 tons, valued at $3,095,600, or an average of $14.17 per ton.

Related Subjects. The reader is referred to the following articles in these volumes:

Alfalfa	Grasses
Barn, subhead *The Hay Barn*	Proteins
Clover	Timothy

HAY, JOHN (1838-1905), an American statesman, diplomat and writer, famed for his advocacy of the "open door" policy in regard to Chinese trade, for his work in behalf of world peace, and for his brilliant management of the foreign affairs of the United States while he was Secretary of State under Presidents McKinley and Roosevelt. He was born at Salem, Ind., was graduated at Brown University in 1858, and after studying law was admitted to the bar at Springfield, Ill., in 1861. He was a close personal friend of President Lincoln, who made him his assistant private secretary and aid-de-camp, and he later recorded his impressions of the Great Emancipator in his masterly *Life of Abraham Lincoln,* written with the aid of John G. Nicolay. Between 1865 and 1870 Hay was in the diplomatic service as secretary of several foreign legations, and in 1879-1881 he acted as first assistant secretary of state. President McKinley made him ambassador to Great Britain in 1897, and a year later he was appointed Secretary of State, a position which he filled with high distinction until his death. In addition to the *Life of Lincoln,* he wrote, among other

JOHN HAY

works, *Pike County Ballads, Castilian Days* and several volumes of essays.

HAYDN, *ha'd'n,* in German *hi'd'n,* JOSEF (1732-1809), celebrated musical composer, the originator of the symphony in the form afterwards perfected by Mozart and Beethoven. The character of his music, in the simplicity of its beauty, its hopefulness and its geniality, is a reflection of his own temperament. To the children of his day he was lovingly known as "Papa Haydn."

JOSEF HAYDN

"Melody is the charm of music, and the invention of a fine air is the work of a genius"—this is the principle upon which he based his 125 symphonies, eighty-three quartets, thirty-eight trios, eight oratorios, fourteen operas, twenty-four concertos for different instruments, and his many songs.

He was born at Rohrau, Austria, first gained recognition at the age of eight as choir boy at Saint Stephen's Church, Vienna, and later became a popular music instructor in that city. From 1761 to 1790 he was musical director to Prince Esterhazy, and many of his best symphonies, several operas, much church music, and a large amount of chamber music of every description were the outcome of his activity during this time. He was the first to declare his confidence in Mozart's powers, and they became warm friends. In 1791 and 1794 Haydn visited England, where he brought out his *Twelve Grand Symphonies.* Upon his return to Austria he composed his oratorios, the *Creation* and the *Seasons.* The *Creation* contains music of much beauty and power, and in the orchestral treatment of many of its passages may be regarded as the foundation of modern descriptive music.

Consult Upton's translation of Höcker's *Josef Haydn.*

HAYES, RUTHERFORD BIRCHARD (1822-1893), an American soldier and statesman, and the nineteenth President of the United States. After four years of distinguished service in the War of Secession, Hayes served several terms as Representative in Congress and as governor of Ohio, and was then President from 1877 to 1881. He owed his election to his conservatism; he was acceptable to a people who felt there had been laxness in the government. His administration was noteworthy chiefly for the end of Reconstruction in the South, for the resumption of specie payments and for the Bland-Allison Silver Purchase Act. (Each of these is described in these volumes.)

In a wider sense, however, the administration is notable for the achievements of Hayes himself. Throughout his term he was constantly handicapped and attacked by an opposing element in his own party, and it was only by the aid of Democratic votes that the reforms he advocated were obtained. Hayes deserves to rank as a great builder; if the President did not always obtain what he wanted, many times he laid a foundation on which his successors could build. Hayes had the advantage of a good education and a variety of interests which gave him a broad, sane outlook on the political and economic problems of the day. If his character and his career are to be summed up in a phrase they cannot be called brilliant, but they were sound and distinguished.

Rutherford Birchard Hayes was born at Delaware, Ohio, on October 4, 1822. His father, also named Rutherford, died in the July preceding his son's birth, leaving his widow in modest but not straitened circumstances. The boy received his primary education in the public school, but at an early age also studied Latin and Greek under a tutor. After further

ation at private academies he entered
n College in 1838, and was graduated
ears later at the head of his class. The
i in which he excelled furnish a key to
aracter, already strongly marked; they
ogic, mental and moral philosophy and
matics.

then spent nearly two years studying in
fice of a Columbus (Ohio) lawyer, and
eted his law studies in the Harvard Law
, from which he was graduated in 1845.
the War of Secession he practiced law in
first at Marietta, later at Fremont, and
at Cincinnati. In the earlier years of his
e, when cases were few, he systematically
ued his studies not only in law but in lit-
e, and in Cincinnati he was chosen a
er of the famous literary club of which
n P. Chase, later Chief Justice of the

RUTHERFORD B. HAYES
yer, major-general in the army, member of
ss, governor of Ohio and President of the
States.

l States, was then a leading member.
' practice increased steadily; he attracted
notice as attorney in several criminal
and from 1858 to 1861 he was city so-
of Cincinnati.

he Army. When the news of the bom-
ent of Fort Sumter reached Cincinnati, a
mass meeting was held in that city to ex-
the sentiments of the people loyal to the
, and Hayes was chairman of the commit-
hich drew up the resolutions. The lit-
club of which Hayes was a member
formed a military company, and Hayes was elected its captain. Before the end of 1861 he had been promoted to the rank of lieutenant-colonel, had seen service in West Virginia, and been judge advocate of the Department of Ohio. In August, 1862, Hayes was offered the colonelcy of the Seventy-ninth Ohio regiment, but he preferred to remain as lieutenant-colonel of his old regiment, the Twenty-third Ohio, which was then a part of the Army of the Potomac. At the battle of South Mountain the Twenty-third Ohio lost nearly half of its men. Hayes himself was wounded, but led his men until he had to be carried from the battlefield.

On his recovery from his wound he was appointed colonel of his regiment, and thereafter was conspicuous in several important expeditions, notably one which he led into Ohio to cut off the retreat of General John Morgan and his raiders. In the spring of 1864, in the expedition which cut the lines of communication on the Virginia and Tennessee Railroad between Richmond and the southwest, Hayes commanded a brigade; he led the principal charge on the enemy's works with conspicuous boldness. In the Shenandoah campaign his brigade was a part of General Sheridan's army, and he himself won praise.

At the second battle of Winchester, on September 19, 1864, he performed a daring feat. He was leading an assault against a battery standing on a slight rise of ground, when he ran into a swamp about 150 feet wide. His horse was caught in the mire, but Hayes dismounted and waded on alone. When he reached dry land he turned and called to his men to follow him. About forty of them crossed the bog and seized the battery after a hand-to-hand fight. A week later, at Fisher's Hill, he routed the enemy by a brilliant flank attack under great difficulties, and at Cedar Creek his bravery was so outstanding that General Crook, his commander, approached him after the battle and said, "Colonel, from this day you will be a brigadier-general." On March 13, 1865, he was further rewarded by the rank of brevet major-general. Grant, in his *Personal Memoirs*, written twenty years later, said of Hayes that "his conduct on the field was marked by conspicuous gallantry, as well as the display of qualities of a higher order than mere personal daring."

Representative in Congress and Governor of Ohio. Hayes does not rank as one of the great commanders in the War of Secession; as a military strategist he is not to be compared with Grant, Lee or Sherman. He was, however, a

man who won popularity and devotion from his followers. The Ohio soldiers in the army almost unanimously made him their choice for governor of Ohio in 1864, and in August of the same year he was given the Republican nomination as Representative from the Second Ohio district. At this time Hayes was in active military service, and when a friend suggested to him that he ought to ask leave of absence in order to campaign for the seat in Congress, he made the famous reply, "An officer fit for duty who at this crisis would abandon his post to electioneer for a seat in Congress ought to be scalped." He was elected without any effort on his part, took his seat in the House in December, 1865, and was reëlected in the next year.

He had served only his first term when the Ohio Republicans nominated him for governor of the state. Some idea of his personal popularity may be gained from the fact that he was elected, although the negro-suffrage amendment to the state constitution, the issue on which he made his campaign, was defeated by 50,000 votes. The Democrats carried the legislature, which promptly elected as United States Senator Allen G. Thurman, Hayes' recent opponent for governor. Two years later Hayes was again elected by a substantial majority over George H. Pendleton. During these four years in the governor's chair his record was excellent, and his reputation as an advocate of civil service and prison reform and of sound money was more than local.

At the close of his second term Hayes was fully determined to retire to private life. He refused to be a candidate for United States Senator, although his election would have been almost certain. After much urging he was a reluctant candidate for Representative in Congress in the summer of 1872, but was defeated. In 1875, in spite of his repeated statement that neither his interests nor his tastes would allow him to reënter public life, he was nominated for governor by the Republicans. Governor William Allen was the Democratic candidate for reëlection, on a platform remarkable for the number of national issues inserted in it. The Republicans in Ohio were by no means united on the questions at issue, but Hayes won in a campaign which attracted the attention of the nation. He was then one of the foremost advocates of "honest money," one of the campaign issues, and was at once recognized as the Ohio candidate for the next Republican nomination for President. In the national convention, held at Cincinnati in June, 1876, the leading candidates were James G. Blaine, Oliver P. Morton, Benjamin H. Bristow and Roscoe Conkling. Hayes received only sixty-one votes on the first ballot, but his strength gradually increased until he was nominated on the seventh ballot.

The Election of 1876. The Democratic candidate for President was Samuel J. Tilden, who had been instrumental in breaking up the Tweed Ring (see TWEED, WILLIAM M.), and had later made an excellent record as reform governor of New York. A third party, the Greenback (which see), nominated Peter Cooper for President, and made its first appearance as a national political party. Both Hayes and Tilden were men of high character, and there was little to choose between them. The election was very close, Hayes receiving a popular vote of 4,033,950 to 4,284,885 for Tilden. On the face of the returns Hayes received 185 electoral votes to 184 for Tilden, but both parties charged that frauds had been practiced. The Democrats claimed to have carried Louisiana, Florida and South Carolina, but the Republican canvassing

ELECTION OF 1876

The cross-shaded states gave their electoral votes to Hayes; those in black voted for Tilden. The white areas were nonvoting territories.

boards and governors certified the Republican electors. The disputes grew very bitter, and at one time it seemed as if the control of the government might be taken by force. The issues were finally submitted to a special Electoral Commission (which see), which decided every dispute in favor of Hayes by a strictly partisan vote, eight Republicans to seven Democrats. On March 2, 1877, two days before the inauguration, Hayes was declared duly elected by an electoral vote of 185 to 184.

Throughout the trying months from November to March, when the country was almost on the verge of another internal conflict, both Hayes and Tilden conducted themselves with notable calm and dignity. Hayes' attitude was

in a letter to John Sherman: "You feel, I re, as I do about this whole business. election would have given us about forty al votes at the South—at least that But we are not to allow our friends to one outrage and fraud by another. must be nothing crooked on our part." nly justice to Tilden to say that he ex- l himself in similar fashion.

s' Administration (1877-1881). Hayes ted a strong Cabinet, including William arts as Secretary of State, John Sherman retary of the Treasury, Carl Schurz as ary of the Interior and David M. Key as aster-General. The appointment of Key, ad been a Confederate officer, indicated nciliatory attitude of the administration l the South. Only twelve years had l since the end of the War of Secession, lready a Federal general summoned a lerate officer to aid him in the govern- of a reunited nation.

of Reconstruction. In South Carolina ouisiana there were two sets of state offi- nd two legislatures, one Republican and emocratic, each claiming to have re- a majority of the popular vote. In states the Republican officers were in sion of the state house and the govern- records, but only through the support deral troops. Most of the influential citizens had given their support to the ratic candidates. President Hayes had y made up his mind that the use of l States troops to maintain one faction South against another must come to an and when he had received assurances Southern leaders that they would use influence for the maintenance of order he rights of all classes of citizens, he d the withdrawal of the troops in April, With the withdrawal of the soldiers the tbag" governments inevitably came to l, and the government of the South again into the hands of its native citizens.

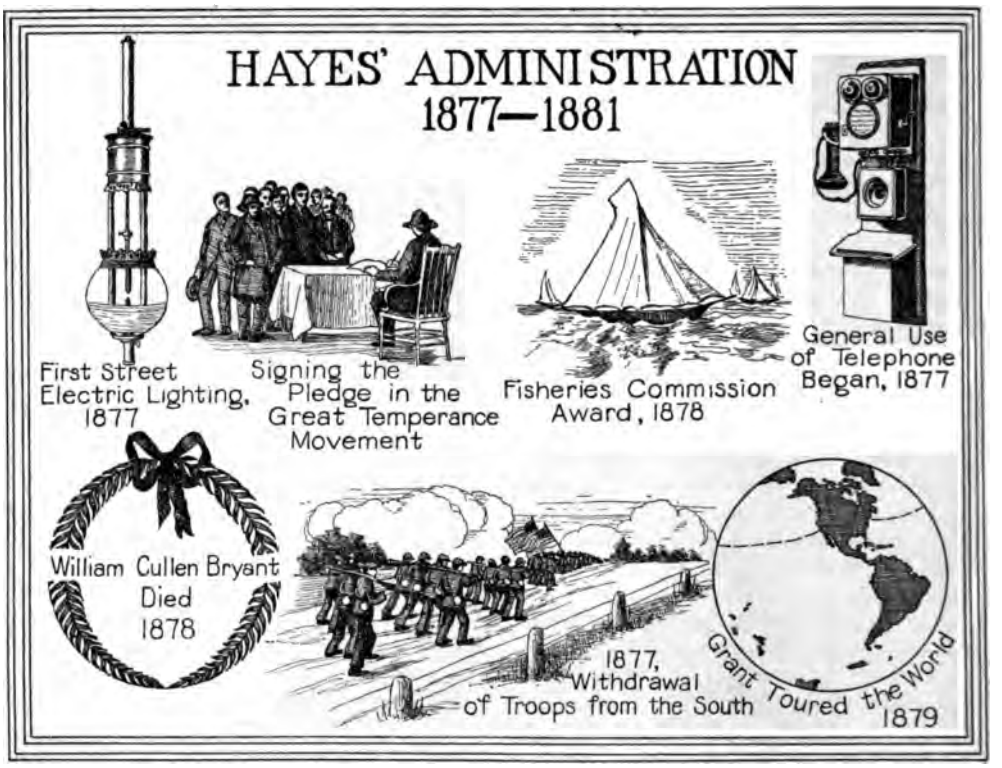
ARPETBAGGERS.

ro Exodus. The end of reconstruction t least partly responsible for the move- of large numbers of negroes from the to Northern and Western states. The nent began early in 1879 and continued l force for over a year. Over 40,000 s settled in Kansas alone, and large rs also went to Indiana and Missouri. xplanations given for this movement by groes were that they were asked to pay exorbitant rents and prices in the South, and that they were kept at an economic and political disadvantage. Whatever the reasons may have been, most of the negroes were poor and reached their destinations half-starved, penniless and without promise of work; it was only through the generosity of many Northerners that hundreds were saved from starvation.

Labor Troubles. The panic of 1873, at the beginning of Grant's second term, was followed by a period of financial and economic depression, during which thousands of laboring men were out of work or were earning less than their former wages. Laborers were discontented, and gave expression to their feelings by frequent strikes, the most serious of which was the railroad strike of 1877. It began on the Baltimore & Ohio Railroad, spread to the Pennsylvania System, and affected practically every line east of Chicago and north of the Ohio River. At one time about 100,000 men were on strike. Thousands of dollars worth of property was destroyed, about 100 lives were lost, and Federal troops were sent to Pennsylvania, Maryland and Illinois to preserve order.

There were serious strikes of miners in West Virginia, where Federal soldiers were again needed to preserve the peace. It was also in that year, 1877, that the power of the Molly Maguires was finally broken. This was a secret organization, formed in the Pennsylvania coal regions about 1854; after some years it became so powerful that it did not stop at murder to gain its ends. It brought about a great strike among the coal miners in 1875, and for two years its members dominated the councils of the miners. The mine owners bitterly opposed it, and through their efforts it was broken up and several of its leaders were executed for murder. Equally typical of the discontent among laborers was the growing power of the Knights of Labor (which see), and the farmers continued to express their opposition to capital through the Grange (which see).

Financial Legislation and Resumption of Specie Payments. After the law of 1873 removed the silver dollar from the list of standard coins, gold was the only unlimited legal-tender metallic money in the United States. In January, 1878, Congress adopted a joint resolution making all bonds of the United States payable, at the option of the government, in silver dollars, and a month later it passed the Bland-Allison Act. This act did not restore the free and unlimited coinage of silver, but it required the Secretary of the



Treasury to buy not less than $2,000,000 or more than $4,000,000 worth of silver bullion each month and coin it into dollars at once.

The President promptly vetoed the Bland-Allison Act because the enormous and increasing production of the Western mines was steadily driving the price of silver downward. At that time a silver dollar of 412½ grains, the weight fixed by the Act, would contain only ninety cents' worth of silver, and the price of silver was steadily declining. Hayes argued that it would be a breach of faith to pay the national debt in any coin worth less than that which had been received from the sale of bonds. Congress, however, did not agree with the President. Some members claimed that large purchases by the government would raise the price of silver; others said that the coinage of silver could alone satisfy the demand for more and cheaper money; and still others argued that a "cheap dollar," which cost the government only ninety cents, would lower taxation by enabling it to pay off the national debt in silver. For these reasons Congress passed the bill over the President's veto.

During Grant's administration Congress passed an act providing for the resumption of specie payments on January 1, 1879. The act was chiefly the work of John Sherman, whom Hayes appointed Secretary of the Treasury. No preparation for resumption had been made before Sherman took office, but in 1877 he began to accumulate a gold reserve in the Treasury. On January 1, 1879, the gold coin on hand was more than enough to redeem all the greenbacks likely to be presented. As soon as everybody knew that the paper money could be redeemed in gold, nobody was anxious to make the exchange. Specie payments were thus resumed without serious difficulty.

Civil Service. President Hayes began his administration with earnest efforts for the reform of the civil service. In many branches competitive examinations for clerkships were instituted, and in all branches political influence was less useful than it ever had been before. The supposed right of Congressmen to dictate who should be the Federal office-holders in their states or districts was not recognized, although their advice was sometimes asked. The President's independent attitude found no favor among the politicians and most Congressmen. Congress refused to provide for the civil service commission which Hayes re-

OUTLINE AND QUESTIONS ON RUTHERFORD B. HAYES

Outline

I. Years of Preparation

(1) Birth and parentage
(2) Education
(3) Legal practice

II. Military and Political Career

(1) At South Mountain
(2) In Shenandoah campaign
  (a) Personal daring
(3) Promotion
(4) As representative in Congress
(5) As governor of Ohio
  (a) His excellent record
  (b) Advocacy of "honest money"
(6) Presidential election of 1876
  (a) Charges of fraud
  (b) Choice of Hayes by Electoral Commission

III. His Administration

(1) End of Reconstruction Era
  (a) Disputed elections in Southern states
  (b) Federal troops withdrawn
  (c) Movement of negroes into Northern and Western states
(2) Labor troubles
  (a) Financial depression
  (b) Railroad strikes
  (c) Miners' strikes
    1. The Molly Maguires
  (d) Knights of Labor
  (e) The Grange
(3) Financial reform
  (a) Resumption of specie payments
  (b) Bland-Allison Act
    1. Passed over President's veto
(4) Other important events
  (a) Attempts at Civil Service Reform
  (b) Chinese Exclusion Act
  (c) Atlantic fisheries dispute settled
  (d) Mississippi River improvements completed
  (e) Life-saving service organized
(5) Election of 1880
  (a) Issues
  (b) Candidates
  (c) Result

IV. Later Years, and Character

(1) Interest in reforms
(2) Honors
(3) Estimate of character

Questions

What was the "negro exodus," and what caused it?

What great tribute did an ex-President pay to Hayes?

What was "carpetbag" government, and when was it discontinued?

Describe one act of great daring performed by Hayes.

What appointment made by Hayes showed that North and South were coming into closer accord?

What shows his attitude toward his own contested election?

Why was he not in favor of a Chinese Exclusion Act?

What brought about the disputes over the election of 1876? How were they settled?

Why did not Hayes approve of the Bland-Allison Act?

How did the youth of Hayes differ from that of Lincoln?

How many ballots were taken before Hayes was nominated for the Presidency?

Who were the Molly Maguires and what were their methods?

To what characteristic did Hayes really owe his election?

What showed his personal popularity at the time of his election to the governorship?

What bad effects did his Presidential administration feel of troubles in a former administration?

quested, and several times refused to confirm the President's appointments of able men. The most important controversy over civil service concerned the New York customhouse. Hayes removed the collector of customs, Chester A. Arthur, and the naval officer, Alonzo B. Cornell, because the customhouse was "used to manage and control political affairs," and because Arthur and Cornell refused to reform it. (For details, see ARTHUR, CHESTER ALAN.)

Other Events. The foreign relations of the government during the Hayes administration were lacking in startling incidents. Congress passed a law in 1879 prohibiting Chinese immigration (see CHINESE EXCLUSION), which Hayes vetoed because it violated a treaty obligation. The only other noteworthy event affecting foreign countries was the settlement of the Atlantic fisheries dispute (see WASHINGTON, TREATY OF). Of great importance to the Mississippi Valley was the completion of the improvements at the mouth of the Mississippi River in accordance with the plans of Captain James B. Eads (see JETTY). The lower Mississippi Valley, and in fact the entire South, was swept by an epidemic of yellow fever in 1878 and 1879. The latter year was also noteworthy for the organization of the United States life-saving service. Hayes had announced, in 1876, that he would not, under any circumstances, accept reëlection to the Presidency. In the election of 1880 the Republican candidate, James A. Garfield, was elected over General Winfield S. Hancock. (For details, see GARFIELD, JAMES ABRAM.)

An Active Ex-President. Hayes was only fifty-nine years old at the end of his term. He was still vigorous in body and mind, and his retirement from public office gave him leisure to devote to reforms and charities in which he was interested. He was for a number of years president of the trustees of the John F. Slater Fund for the promotion of industrial education among the negroes in the South, and was also one of the trustees of the Peabody Educational Fund (which see). He was an active member of the National Conference of Charities and Corrections, served a term as president of the National Prison Association, was a trustee of Western Reserve University, of Ohio Wesleyan University and of several other charitable and educational institutions. He was senior vice-commander of the Loyal Legion, but of all the honors given him, he was perhaps proudest of the presidency of the Twenty-third Regiment Ohio Volunteers' Association, the regiment which was always his regiment. He died at his home at Fremont, Ohio, on January 17, 1893. W.F.Z.

Consult Howells' *Life of R. B. Hayes;* Conwell's *Life and Public Services of Hayes.*

HAY FEVER, or HAY ASTHMA, *az'ma,* a very disagreeable affection of the mucous membranes of the eyes, nose, mouth and bronchi, accompanied sometimes by asthma and fever. It is characterized by frequent paroxysms of sneezing and by a copious watery flow from the nose and eyes. The attacks occur in the late summer months and are caused, in persons susceptible to the disease, by the pollen of various grasses, including ragweed, goldenrod, burdock, pigweed, rye, timothy, etc., after they begin to ripen. Change of climate is beneficial in most cases.

Some physicians inject a toxin made from a mixture of pollens; others vaccinate the sufferers with a serum from rabbits which have been inoculated with the toxin. These remedies, however, relieve and do not cure the disease. They sometimes produce immunity from the disease for one season, and are more or less beneficial to some patients. The United States Hay Fever Association, with headquarters in New York City, is striving for the enactment and enforcement of anti-weed laws in various states. An ailment very similar to hay fever, called rose fever, attacks some persons in the spring. W.A.E.

HAYNE, *hain,* PAUL HAMILTON (1831-1886), an American poet, popularly known as "the laureate of the South." There are other Southern poets, notably Poe and Lanier, whose work has won wider recognition and who possessed a greater measure of poetic genius, but Hayne deserved his title, for he succeeded in expressing in his poems much of the spirit of the South.

Hayne was born in Charleston, S. C., and grew up in the household of his uncle, Robert Young Hayne, famed for his brilliant debate with Daniel Webster on states' rights. He was educated at South Carolina College, and then studied law, but he was under no necessity of earning his living and preferred to spend his time in literary pursuits. Three volumes of his poems had appeared before the outbreak of the War of Secession, but that conflict saw the end of his pleasant, leisurely life. He served in the Confederate army, and during the struggle suffered financial ruin. In his later years and after his death his cottage near Augusta, Ga., was the center of an affection-

rest. Such poems as *In the Wheat-*
pects of the Pines and *A Storm in the*
show his understanding of nature,
g Bonny Brown Hand and *A Little*
Fain Would Linger Yet have a more
touch.

E, ROBERT YOUNG (1791-1839), an
statesman whose name is inseparably
d with that of Daniel Webster, for
he opponent of Webster in a remark-
ate on the subject of states' rights
eld the interest of the Senate from
19 to 27, 1830, and attracted the atten-
the world.

was born in Colleton District, S. C.,
mber 19, 1791, studied in private
and at the age of twenty-one was
to the bar. He saw service during
of 1812, and immediately on its close
the legislature of his native state.
18 to 1823 he was attorney-general of
, and became increasingly popular by
his able and ardent advocacy of the
of states' rights (which see). Each
made a compact with the Federal
ent, he argued, and if the latter was
the agreement, as he felt it had been,
ad a right to refuse to recognize Fed-
. On this platform he was elected in
the United States Senate, where he
became known as one of the foremost
ghts champions. His part in the de-
a brilliant argument, worthy to rank
reply of Webster. The following is
eristic passage from Hayne's contribu-
he famous argument:

> ople whom I represent, Mr. President, lescendants of those who brought with this country, as the most precious of essions, "an ardent love of liberty;" and t shall be preserved, they will always be nfully struggling against the consolida-ie government as the worst of evils. hen, Mr. President, are the true friends ion? Those who would confine the Fed-rnment strictly within the limits pre-y the Constitution; who would preserve ates and the people all powers not ex-legated; who would make this a Federal National Union, and who, administer-overnment in a spirit of equal justice, ake it a blessing and not a curse.

South Carolina put into practice his
by declaring certain Federal laws null
l, Hayne supported his state in the
sy which ensued, and in 1832 resigned
Senate and became governor of South
During his two years in this office
he remained true to his states' rights and nullification principles, but showed himself not only an able but a moderate man as well, more than once using his influence to prevent outbreaks. His last public service was rendered as mayor of Charleston, 1835 to 1837. A.MC C.

Consult Swift's *The Great Debate Between Robert Y. Hayne, of South Carolina, and Daniel Webster, of Massachusetts*, in "Riverside Literature Series."

HAY-PAUNCEFOTE, *pawns'foot,* **TREATY,** an agreement between Great Britain and the United States, defining the latter country's policy regarding a canal to be built across the isthmus connecting North and South America. It was drawn up by John Hay, Secretary of State, and Sir Julian Pauncefote, English ambassador, and signed by them November 18, 1901. When first drafted, in 1900, under President McKinley, it provided: (1) that such a canal should be constructed by, or under the direction of, the United States; (2) that it be neutralized on the same basis as the Suez Canal (which see); (3) that other nations should be asked to join in the guarantee of neutrality. These provisions were not agreeable to the Senate, and amendments were offered, which, however, Great Britain refused to accept. Finally, on March 5, 1901, the treaty expired by limitation.

As the result of a second conference the two diplomats presented to their respective countries a treaty which provided that (1) no nation was to be asked to guarantee neutrality; (2) while the Clayton-Bulwer Treaty (which see) was made null and void, its principles of neutrality were to be observed; (3) in war times the United States was to be given undefined rights of control and the canal was not required to be kept free and open at such times. Neither was the erection of forts commanding the canal and adjoining waters prohibited. Furthermore, all nations were to enjoy equal rights and benefits from the canal, and any change in the sovereignty of the territory through which it extended was not to influence the principles of neutrality.

Therefore, when Congress passed the Panama Canal Act in 1912, which provided that American vessels engaged in domestic commerce should be free from the tolls paid by other boats, Great Britain objected, saying that it violated the provision for equal rights to all nations, and suggested that the question be settled by arbitration. No action was taken on the latter point, but in 1914, in spite of great

opposition in Congress, a bill was passed repealing the disputed provision of the Panama Canal Act, for it was President Wilson's belief that the nation's honor depended upon the strict observance of the treaty. See PANAMA CANAL.

HAYS, CHARLES MELVILLE (1856-1912), a Canadian railway executive, who reorganized the Grand Trunk Railway and was largely responsible for the construction of the Grand Trunk Pacific. Hays was a man of executive ability and large views, and deserves to be ranked with the constructive railway men of America. He was born in Rock Island, Ill., but from his long connection with the Grand Trunk Railway was always regarded as a Canadian. He began railroading when he was seventeen, and rose rapidly until, in 1886, when he was only thirty, he was general manager of the Wabash Railway. In 1897 he accepted the position of general manager of the Grand Trunk at Montreal. He remained there four years, during which he reorganized the Central Vermont Railway Company, a subsidiary of the Grank Trunk, and double-tracked the line of the Grand Trunk from Montreal to Chicago. In January, 1901, he became president of the Southern Pacific, but in the autumn of that year was recalled to Montreal to become second vice-president and general manager of the Grand Trunk. It was largely due to his efforts that the Grand Trunk Pacific Railway Company, of which he was president, was organized. On January 1, 1910, he became president of the Grand Trunk Railway Company. While returning from a trip to England, where he had made arrangements with the directors for further expansion, he perished in the *Titanic* disaster, on April 15, 1912. G.H.L.

HAZE, the accumulation of extremely minute particles in the air which are individually invisible, but which, collectively, produce a fogginess of the atmosphere. Unlike fog, haze is often observed when the lower air is unusually dry. When the upper air is in the first stage of cloudiness, the particles comprising haze are usually small drops of water, mixed with smoke or dust. This is termed water haze, and appears gray in reflected light. Extensive forest fires cause a smoke haze, which is dense blue in color and which travels many miles from the scene of the fire; sometimes the smoke from a great forest fire will darken the atmosphere perceptibly five hundred miles distant. Volcanic eruptions also throw a fine dust into the air, producing coloration of the atmosphere which is observed for great tances. Haze is frequently observed du the autumn months, and makes an effec background for the changing foliage. INDIAN SUMMER; DUST, ATMOSPHERIC.

HAZEL, *ha'z'l,* the tree or shrub which p duces the nut called the *filbert.* Most of cultivated varieties are grown in Europe. T best nuts come from Spain, but North Ame has two species of its own, which are wid distributed over the woodland. In the spri when many trees are showing beautiful flow the hazel is not conspicuous, for its flow are modest catkins; but in autumn, when pointed, scallopy leaves turn a rich yellow, hazel would be sadly missed from the woo Nowhere do these trees grow very large, the wood is of little value to the cabin maker; but baskets, crates, whip handles, ho and such articles are made from the stro flexible rods.

The word *rods* calls attention to a n interesting point about the hazel, for fr time immemorial it has been thought tha forked hazel twig possessed marvelous pow Biblical writers, ancient Roman writers, writers in all countries of Europe since those early days have mentioned the use of hazel rods as a means of determining the presence of precious minerals or water below the earth's surface, and in many rural communities the old belief still persists. It is the real hazel which is used for this purpose in England, b in North America a different shrub has be christened *witch* hazel because of its suppos magic powers. (See WITCH HAZEL.) Low speaks of this old superstition in the lines—

THE HAZEL
Leaves and growing nu
At right, the ripened nut af
frost opens the bur.

> Which like the hazel twig in faithful hands,
> Points surely to the hidden springs of truth.

The nuts from the American hazels, whi grow wild, have no especial value save as th delight the children on crisp autumn days, b there is a large commerce in the cultivat nuts of Europe. A valuable oil, much used perfumers and by painters, is prepared fr

nd they are also among the most popu-
for eating.

N, *ha'z'n,* JOHN DOUGLAS (1860-), dian barrister and statesman, premier Brunswick from 1908 to 1911, and 11 Dominion Minister of Marine and in the Conservative Ministry of Sir Borden. Hazen was born at Oromocto, and attended the common schools of cton and the University of New Bruns- om which he was graduated at the age teen. He was called to the bar in 1883, s elected to his first office, alderman of cton, in 1885. He was alderman for ears, and then served a term as mayor. ing to Saint John at the end of his e continued to practice law, and from 1896 was a Conservative member of the on House of Commons. In 1899 he cted to the New Brunswick assembly, the following nine years was leader of nservative opposition. In 1908 he was n to form a ministry, in which he be- remier and attorney-general. He re- these offices in 1911 to accept appoint- the Dominion Cabinet, and took his the House of Commons for Saint John mation. G.H.L.

N, WILLIAM BABCOCK (1830-1889), an n major-general and the most re- chief of the Signal Service Bureau, was West Hartford, Vt. In 1855 he was ed at West Point and in the War of n served as colonel of the Forty-first nt of Ohio Volunteers, which he had strumental in recruiting. He served in Kentucky, won distinction in the of Corinth and Shiloh, and with his d captured eighteen pieces of artillery sionary Ridge. In Sherman's march Georgia he commanded the second di- f the Fifteenth Corps, and in 1864 was d to the rank of major-general of vol- When the war closed he was bre- major-general of the United States He was military attache to the United Legation in Vienna during the Turko- War. In 1880 he was appointed chief fficer and did much to raise the signal to a higher point of efficiency. The standard time meridians were adopted hrough his efforts, and he also introduced etin system of hourly weather service as the "cold wave" signals. His published nclude *Our Barren Lands, A Narrative tary Service* and *The School and the Army in Germany and France with a Diary of Siege Life at Versailles.* See WEATHER BUREAU.

HAZING, the infliction by senior college students of severe "practical jokes" upon their junior fellows, which often involve bodily harm. The term also includes any humiliating action entailing the abandonment of self-respect and dignity, performed by a person through fear or threat. The excuse for hazing in colleges is that it "restrains the ambitions of new students which would otherwise render college life intolerable to the older undergraduates." The hazed one's consolation is the prospect of inflicting similar indignities on others when he himself is an upper classman.

Hazing has resulted disastrously in many instances; students have died from the effects of the pranks played upon them, and some cases of insanity have developed from fright experienced by the victims. School officials within recent years have placed heavy penalties, usually expulsion, upon participants. The practice has been largely discontinued and, indeed, entirely abandoned in some colleges and universities. In the military and naval schools of practically all governments hazing is forbidden, and very severe penalties are imposed for violation of the rule.

HAZLETON, *ha'z'l t'n,* PA., a city in Luzerne County, in the eastern part of the state, about midway between the northern and southern borders, and a center of the coal-mining industry. Pottsville is twenty-nine miles southwest, and Wilkes-Barre is thirty-one miles north. Transportation facilities are afforded by the Pennsylvania System and the Lehigh Valley Railroad. Wilkes-Barre is an hour's ride from Hazleton via the Wilkes-Barre and Hazleton third-rail system, and connections at this point are made with the Lackawanna & Wyoming Valley Railroad.

Hazleton was settled in 1804, was incorporated as a borough in 1856 and was chartered as a city in 1892. The abundant growth of the hazel bush during the early days of the settlement gave rise to the name. In 1914 the commission form of government, with five elective officers, was adopted. Nearly all nationalities are represented in its population, which increased from 25,452 in 1910 to 28,491 in 1916, by Federal estimate. Owing to its picturesque situation and high altitude (1,700 feet), the city enjoys popularity as a summer resort.

Because of its location in the rich anthracite coal district of Pennsylvania and the resources

of this region, employment is provided for a large number of the people. About 1,500 are employed in the leading iron works, one of the best-equipped plants of its kind in the United States. There are also manufactories of steel and brass products, and the city has extensive silk mills, knitted-wear and shirt factories, and breweries. The immense waste of the coal banks of mines in the vicinity is converted into electricity, the generating station having a capacity of 25,000 horse power. This power is distributed throughout the surrounding territory within a radius of fifty miles by steel tower and pole lines, and has given the town the local name of *The Power City.*

Hazleton has several fine public buildings, notably the city hall, the post office and the buildings of the First National and Hazleton National banks, and of the Markle Banking and People's Savings trust companies. In addition to two high schools, the city has Hazleton and Saint Gabriel academies, a business college and a library. The state hospital for miners is also located here. H.H.F.

HAZ'LITT, WILLIAM (1778-1830), one of the greatest of English essayists and critics. He wrote of nature and of art and the characters of men; as a critic of the drama he has probably never been equaled. He was one of the most successful controversalists and a master of epigram and sarcasm. Born at Maidstone, he started out to study for the ministry, but abandoned this for portrait painting. Then he turned his attention to literature, his first publication being an *Essay on the Principles of Human Action.* His *Round Table,* a series of essays on literature, men, and manners; his *View of the Contemporary English Stage;* his *Lectures on the Poets, The English Comic Writers* and *The Dramatic Literature of the Age of Elizabeth;* his *Characters of Shakespeare's Plays* and *Table Talk*—these sustain his reputation in the field of English letters. His autobiographical essays, however, are perhaps the most delightful of all his works, with their quiet humor and leisurely style.

HEAD. The head is the seat of the brain and the chief organs of special sense—the eyes, ears, nostrils, mouth and tongue. It is the most important part of the body. We often speak of the head as the mind. When we say that a man has a good head we mean that he has a strong mind or strong brain power. An injury to the head affects the entire body, since the brain controls to a greater or less extent the functions of all the other organs.

The chief parts of the head are the cranium, formed by the skull, and the face. The skull is formed by the union of eight bones, the frontal, two temporal, two parietal, the occipital and two sphenoid. The skull encloses and protects the brain, and its bones are formed of three layers, an outer and an inner layer, both hard and compact, and between these a porous layer which aids in protecting the brain from shocks in case of a fall or a blow.

The occipital bone rests upon the upper vertebra, with which it forms a joint that enables the head to turn in any direction. The

BONES OF THE HEAD

(1) Occipital	(7) Nasal
(2) Temporal	(8) Ethmoid
(3) Parietal	(9) Lachrymal
(4) Sphenoid	(10) Superior Maxillary
(5) Frontal	(11) Inferior Maxillary
(6) Malar	(12) Zygomatic Arch

greater part of the weight is in front of this point of support, and the head is held in an erect position by the muscles of the neck. If one falls asleep when in a sitting position, those muscles relax and the head falls forward. This is why a person nods when he is sleepy. See FACE; SKELETON.

The term *head* is often used to denote rank. We speak of one as being at the head of his class or at the head of a column. The term is also used to indicate leadership, as in the expressions, "the head of the house," or "the head man." W.F.R.

HEAD, SIR EDMUND WALKER (1805-1868), a British colonial administrator and writer on art, at one time lieutenant-governor of New Brunswick and from 1854 to 1861 Governor-General of British North America. He was a graduate of Oriel College, Oxford, in the class

27, later became a fellow of Merton Col-
and in 1834 was appointed a university
iner. His career as a student was marked
xtraordinary diligence, particularly in the
cs and in economics, with the result that
aid Canada may have had wiser or greater
rnors but none who was his equal in
ing.

ad's successful career was due in part to
friendship of Henry, third Marquis of
downe (1780-1863), whose grandson was
Governor-General of the Dominion.
ugh Lansdowne's influence, Head was ap-
ed in 1836 an assistant poor-law commis-
r, a position which he filled so ably that
as promoted in 1841 to be chief commis-
r. In 1847 he was sent to New Brunswick
utenant-governor and in 1854 succeeded
Earl of Elgin as Governor-General. Dur-
is administration the clergy reserves and
eurial tenures were abolished, and Ottawa
hosen as the permanent capital. His term
fice was noteworthy for the care he gave
to minute details; it is said that he never
d a public document until he had read it
ugh. Personally quiet and retiring, Head
r felt at home in the rough-and-tumble of
ical life, his leanings being rather towards
nd literature. Among other volumes he
: *A Handbook of the Spanish and French*
ols of Painting, and in the year of his
1 there appeared a volume of his poems,
led *Ballads and Other Poems, Original and*
slated. In 1863, after his return to Eng-
from Canada, he was chosen governor of
Hudson's Bay Company, which had just
reorganized (see HUDSON'S BAY COM-
). A distant kinsman of Sir Edmund was
rancis Bond Head (which see). G.H.L.

AD, SIR FRANCIS BOND (1793-1875), a
sh soldier, colonial administrator and
or, lieutenant-governor of Upper Canada
ng the Rebellion of 1837. How he came
e chosen for this important place at such
tical time was a mystery, even to him.
as unfitted for it both by training and by
erament. He was educated as a soldier,
d on the Continent from 1811 to 1815,
two years (1825 to 1827) in South Amer-
n an attempt to develop some gold and
r mines, and in 1834 he was appointed
sistant poor-law commissioner. He was a
commissioner, because he was not called
decide large questions of policy, and his
was one which was easily occupied with
le. He was also known as an author, his
most popular books being the vivid and entertaining *Rough Notes Taken during Some Rapid Journeys across the Pampas and among the Andes,* and another amusing volume, called *Bubbles from the Brunnen of Nassau,* which appeared in 1834.

These experiences and literary accomplishments, while not open to criticism in themselves, were not the preparation needed by the man who was called on to face the demand for reform in Upper Canada. Unfortunately Head was tactless, self-confident, and first ignorant, then misinformed, as to the true state of public opinion in Canada. One of his first acts after reaching Toronto, the capital, in January, 1835, was to summon Robert Baldwin and two other well-known "Reformers" to the executive council. The three accepted office, but almost immediately resigned when it became apparent that the governor had no intention of permitting them any voice in the government. Thereupon the assembly passed a vote of lack of confidence, the parliament was dissolved, and in the ensuing general election the weight of the governor's influence was thrown against the Reformers. Head was convinced that responsible government meant separation from the mother country, and helped the Conservatives to use every possible method to defeat the Reformers. Even William Lyon Mackenzie failed to win a seat. Disappointed in the hope of securing reform by lawful means, Mackenzie felt that only rebellion was left. Soon after the collapse of the rebellion Head resigned rather than appoint two Reformers to office, as demanded by the home government. Though rewarded by a baronetcy in the next year he never again held public office, and spent the rest of his life in literary activity.

Among his later works, which were very popular in their day, are *The Emigrant; Faggots of French Sticks,* a description of life in Paris; *Stokers and Pokers,* sketches of railway construction; and a collection of essays. G.H.L.

HEADACHE, *hed'ake,* a danger signal given by the sensitive nerves of the head, which warns that something is wrong with the human organism. Headache is one of the commonest pains that afflict the human race, and it is usually a sign that poisons have formed somewhere in the body and have passed into the blood. Fatigue, sleeping in bad air, indigestion and constipation are among the principal causes of such poisoning.

Headache is also a symptom of eyestrain, disease of the middle ear (see EAR), typhoid

fever, Bright's disease, malaria and many other disorders. The most severe headaches are those which accompany diseases of the brain, such as meningitis, or tumor of the brain. The location of the pain varies with the different causes of headache. For instance, those suffering from eyestrain feel the pain in the eyeballs and behind the temples; the victim of nervous prostration is liable to suffer from pain in the back of the neck; a deranged liver causes a general headache. Pains of the face, such as neuralgia, are not classed as headaches.

The person of normal health who is careful about his food, who sleeps in a well-ventilated room and who observes the laws of hygiene, may expect to be free from headache. In case of an attack he should by no means resort to any of the widely-advertised headache cures on the market. Headache is a symptom and not a disease, and the cause of the pain should be treated, not the pain itself. There are numerous cases on record of poisoning caused by headache mixtures, most of which contain acetanilid, antipyrine and phenacetin. The United States Department of Agriculture, in *Farmers' Bulletin 377*, utters a stern warning against the use of any headache preparations containing these substances. Chronic cases of headache require the services of a competent physician. An ordinary headache can be relieved by rest, lying down in a darkened room, abstinence from food for a time and purgation. W.A.E.

HEALTH, *helth.* In one of the *Fables* of the English poet John Gay may be read these lines:

When health is lost. Be timely wise;
With health all taste of pleasure flies.
When health is lost. Be timely wise;
With health all taste of pleasure flies.

Certainly the poet did not overestimate the worth of one of the greatest blessings mortals can enjoy—health, which is the condition of physical well-being. The healthy person is one whose bodily functions are being performed easily and without pain. The physician says that anyone who sleeps well and who can digest his food while satisfying a hearty appetite may be considered in a good state of health. Under modern conditions very few persons enjoy perfect health, but the observance of a few simple rules helps to keep one reasonably well. Very certain means of securing and maintaining good health are given in the article HEALTH HABITS, immediately following.

Related Subjects. Various articles relating to health are presented in these volumes under their proper headings. The reader is especially referred to the following:

Athletics	Health Habits
Baby	Heating and Ventilation
Board of Health	Hygiene
Breath and Breathing	Immunity
Child	Life Extension
Diet	Mastication
Digestion	Medicine and Drugs
Disease	Mental Handicaps
Education (page 1944)	Nutrition
Fatigue	Physical Culture
Fletcherizing	Quarantine
Garbage	Sanitary Science
Gymnastics	Sewer and Sewerage

In addition to these, many of the articles listed in the indexes under ANATOMY, DISEASE and FOOD contain information bearing on the topic.

HEALTH, BILL OF. See BILL OF HEALTH.

HEALTH HABITS. Many of the physical difficulties of the school child are caused by the wrong sort of *habits.* Habit formation is the basis of character, and in much the same way is also the basis of health. When bad health habits are formed early in life it is a very difficult matter to break them later, for they become an almost unconscious part of daily life. On the other hand sound health habits should be largely a matter of automatic action on our part. But good health habits can be acquired only through definite conscious action at first, and such action must be based on accurate knowledge. With this in view let us consider how to form successfully the essential habits of health.

Health Habit Formation. But comparatively few people enjoy good health most of the time. More than three million people in the United States and Canada are sick all of the time, yet at least half of this sickness might be prevented. Professor Irving Fisher of Yale University has shown that at least one and one-half billion dollars are lost every year through the waste of preventable diseases, to say nothing of lost happiness and permanently-reduced vigor. Much of this sickness is caused by the neglect in early life of sensible health habit formation.

The formation of health habits is fairly easy when begun early, and includes comparatively few simple principles. For our present purpose we may state the following as the most essential health habits:

Food habits.
Sleep habits.
Mental habits.
Exercise habits.
Recreation habits.

Food Habits. While a whole volume might be written on food habits, yet the general prin-

ciple of proper food, including correct eating, is rather simple and may be briefly stated.

First, *food must be clean.* By this we mean not only free from unwholesome foreign matter, but more particularly, free from parasites and *germs of disease.* See BACTERIA AND BACTERIOLOGY

We must form the habit of demanding wholesome food; for example, meats free from tuberculosis germs and certain animal and vegetable parasites; milk from tuberculin-tested cattle, and handled in a sanitary manner from the time of milking to the time of consumption; bakery goods from clean, sanitary bakeries, where not only the bakery itself, but all the employees, are clean and free from infection; vegetables and fruit from clean soil unpolluted with sewage—fertilizer or infected water used in irrigation; the avoidance of water and ice from a polluted source, such as a sewage-infected river, lake or well.

Every year thousands of infants are made sick from infected milk, and many of these die; every year thousands of children and adults suffer or die from infected water, ice, meat, vegetables and other foods, yet the principles of avoiding infection through food are extremely simple. Such principles should become a part of our daily habits. Not only must food be clean and sanitary, but selected with reason in regard to quality, quantity, preparation and variety.

Most people eat too much protein, which is found principally in lean meat, eggs, cheese, peas, beans and lentils. Professor Chittenden of Yale has demonstrated that a high protein diet is always harmful, while a low protein diet reduces intestinal putrefaction, prevents undue fatigue and increases endurance and general efficiency. But in spite of this knowledge most menus commonly in use contain a great excess of protein food (see PROTEINS).

An excess of any one food element produces trouble. Many people suffer from "starch indigestion" because of the use of too much starchy food, such as cereals, bread and potatoes. Some diseases, among them *pellagra,* seem to be largely due to insufficient food and especially to a lack of protein, thus producing malnutrition. Most people suffer from the lack of sufficient water, of which the average person requires at least *six glasses per day.* Green vegetables are eaten much too sparingly by the majority of persons.

Coffee and tea, so commonly used throughout the world, are not foods at all, but *drugs.* The average person takes about six grains of *caffeine* per day in this way, which is far in excess of what a doctor would prescribe for even a single dosage, to say nothing of three hundred and sixty-five such doses during the year. Alcohol is taken by many with meals in the form of wines and beers; yet alcohol, except in very small doses, is not oxidized in the body, and is therefore not a food, but a direct poison, to the tissues of the body, decreasing physical endurance and mental vigor as well as reducing resistance to disease. For example, users of alcoholic drinks as a rule make very poor recoveries from pneumonia and typhoid fever. See ALCOHOLIC DRINKS.

Sleep Habits. Next in importance to food comes sleep. Sleep is a building-up process in which the waste of the day is repaired and energy stored up for further use.

Too little sleep results not only in conscious discomfort but in greatly reduced efficiency. Dr. Crile of Cleveland has called attention recently to the effect of loss of sleep on important organs, such as the thyroid, liver and adrenal glands, and upon the cells of the brain. Long periods of loss of sleep or continued short periods produce permanent effects on our tissues, which rest never entirely efaces. Regular and sufficient hours of sleep should become fixed habits with everyone. Under stress and strain of emergencies such habits will then stand us in good stead, for reserve energy will have been stored up, on which we can draw for some time without serious, if any, damage.

Most adults require eight to nine hours of sleep. Children from six to ten years old require from ten to twelve hours. Older children usually need about ten hours. Of course the hours of sleep required depend largely upon the amount of energy used up in work, play, stress and strain of the day, and on natural resistance, and consequently there will be many exceptions to any general rule.

Mental Habits. Nothing is more important in life than the formation of good mental habits. Very few people understand that there is any direct relation between mental habits and health, but, as a matter of fact, every thought, every emotion, every nervous impulse directly affects the health of the whole body. Dr. Crile's recent studies of anger, fear, mental exhaustion, worry, grief, hatred and other emotions demonstrate that definite damage is done to such organs as the thyroid gland, the adrenals, the liver and the brain, and that a

number of diseases, as Bright's disease, neurasthenia, and apoplexy, may easily result.

Dr. Crile says, "Because of the relation between the brain and other organs in the kinetic system (organs which stimulate muscular action), prolonged emotional stimulation results in such a steady activation (stimulating) of these organs—especially of the liver, the adrenals and the thyroid, that one or the other of them yields under the strain, and one or another disease is established."

Aside from any *moral* question involved, the control of the emotions is one of the most important matters that can concern us in life, for emotional uncontrol often leads directly to physical injury. Just as some diseases are at present quite out of our own control, so some emotions, such as grief, for example, are often unavoidable, but the greatest amount of control possible is in the highest sense desirable.

Emotional *debauches* are just as bad as any other kind of debauches.

Habits of cheerfulness, punctuality and prudence must be formed in early life if they are ever to be of much value to us. Moral habits of every kind formed at this period nearly always stay with us throughout life.

Exercise. Habit formation in exercise is fully as important as any other health habit, although most people fail to realize it. While it should be fairly evident that exercise increases bodily vigor by stimulating the circulation of blood to the various organs and tissues, removing waste products and repairing waste, it is not ordinarily recognized that physical training is also *mental* training.

Physical activity develops and coördinates the brain and muscular system. "In this way the great motor functions are organized in the brain and become a part of the physical basis of mind." Dr. James H. McBride has well expressed the value of physical strength through the exercise of it when he says—

"The strong confident person who has strength to spare, reserves of energy, does his work easily and without friction. Half the timidities and indecisions of men are chargeable less to lack of ability than to lack of the physical vigor, the *quantity* of energy, which is the driving power of character. In all the contests of life an important element in success is the ability to endure prolonged stress, to have the reserve energy that can be drawn upon and utilized as a driving force. This power is not alone necessary in the emergencies, the "short hauls" of life, but also in the long hauls that spread the strain through greater periods. Many of the failures of life are due as much to lack of ability to meet prolonged stress as to lack of experience or intelligence. Men of moderate ability but with great powers of endurance often succeed, while men of greater talent fail for lack of the ability to endure strain.

"The man with a weak body and without the self-confidence that surplus energy gives is liable to be of uncertain judgment. Such a man in the presence of a problem requiring quick decision, doubts and hesitates and stands shivering on the brink of action while hastening opportunities pass him by.

"Much of the loose thinking of our time is undoubtedly due to poor educational drill. In fact the failure of the schools to teach pupils how to apply the mind and how to think is one of their common reproaches. Inability to use the mind effectively is also frequently due to a lack of vigor and physical stamina. A person with poor digestion, or under-developed body, or weak circulation has of necessity a badly nourished brain. Such a brain, unless it belongs to a genius, will do poor thinking.

"The mentally trained person who is also physically strong has the combination that puts his powers at easy command. He can be joyously busy doing the impossible because the doing of it has been made easy by training.

"How much native power there is in all of us that for want of proper training or sympathetic encouragement never comes to maturity! How many of the finer qualities of character that, for want of a kindlier climate of cheerful companionship and wise direction, failed to mature, and now lie dead in us! Very many people are only partly alive. A large part, and, in some, the best part, is dead. The capacity they show is probably only a small share of a fine inheritance which, not knowing how to use, they allowed to die.

"We have an instinctive liking for people who are strong and healthy. They appeal to us by their robustness and their confident display of energy. We do not now need the big muscles that were once necessary in wielding spear and battle-ax. We need, however, as much as the race ever needed, well-developed bodies and habits of health."

Exercise to be of much value must be *enjoyed,* so every person must select for his particular exercises those which he likes best and which are available. Exercise, in a word, should be largely a matter of play, but play of an organized, purposeful character. Once this conception of exercise is understood and put into effect as a habit of life, the individual greatly reënforces his possibilities for health, happiness and life expectancy.

Recreation. Recreation is always *play* in some form, and play continues to perform an important function in our lives from earliest childhood until old age. When we stop playing we practically stop living. Play is our opportunity for self-expression, and only the sick or feeble-minded fail to exercise this instinct in one form or another. The better we play, the better we live.

r is at first preparation for life, and later ues throughout normal life as a pro- re preparation. "Play," says Professor ore, "fits for the larger life to the extent he individual retains plasticity and inter- growth. So long as one is alive there is something to learn. There are visions seen, inspirations to be received, ideals set aglow, sympathies to be cultivated, ons to be refined, dreams of achievement enjoyed, riddles of life to be solved by oof of experience."

hout play little of this would be possible, joyment would cease and the possibilities laptation to the more serious things of ould become quite impossible. Many play without realizing it. Music, art, r, achievements of various kinds, any- which brings new impressions and associa- may serve as play. When we stop play- e grow stale, and become *mentally fixed.* is achievement then becomes practically sible. Play is a *social instinct,* and with- common fellowship with others is lost. ost alert minds most enjoy and profit by The dull and feeble-minded play little ie.

modern methods of education of chil- are based largely on the play instinct, and is no reason why such natural methods l not be utilized throughout all education. matter of fact, those who succeed best in orld are those who discover a work which em is largely play. Any activity which nstantly difficult and irksome is never ded with any great results. We succeed n those things we like best and which to in some degree forms of play.

truly great lawyer, doctor, minister, ian, explorer, merchant or investigator, d play in their business or profession, er they are conscious of it or not. The eason why some people who are not well to their daily work, succeed at all is hey discover some form of regular play *ocation* outside of their daily occupation. we usually call a "fad," but cultivation of while valuable and desirable for most e, would be far less necessary if daily could be regarded as a stimulating form ay. Many people are to-day to some lerable degree misfits in life, and this y through failure in choice of a proper ion. This is the reason why so many fail iness or in health and grow old while still

"We all have our work, our set tasks and duties; but those of us who get the most out of life are they whose work would be their preferred play, quite apart from its pursuit as a means of livelihood." We all need definite forms of recreation quite different from our daily work, but *change* rather than rest is at the base of real recreation. Very few of those of us who toil at uncongenial tasks and look forward to the day when we may retire and enjoy life will ever realize that anticipated pleasure. The time to enjoy ourselves is here and now, and nothing is more important than the intelligent choice of a life vocation which will afford the fullest opportunities for our individual happiness, for the happiest people are generally the most useful.

Through exercise and some forms of play many good habits may be formed; correct postures may be acquired; fairness in judgment of others, skill, exactness, courage, enthusiasm, grace, and a host of useful qualities, become an essential part of our characters. The one who has learned the simple principles of *health habits* is well prepared to play the game of life. See EDUCATION, subtitle *Hygiene of Education; Mental Handicaps;* LIFE EXTENSION. E.B.H.

HEARN, *hurn,* LAFCADIO (1850-1904), interpreter to the Western world of the soul of Japanese life and art. He was born in the Ionian Islands, in Leucadia (pronounced *Lefcadia*), the name which he adopted. Orphaned early in life, he was educated for the priesthood by an aunt; but he was a born rebel and railed against authority and civilization. When nineteen he broke away from the Church, and moved to New Orleans, where he began a journalistic career. From 1887, seeking inspiration, he journeyed through foreign countries until 1890, when he reached Japan, where he found his true sphere of influence. There he became professor of English literature at the Imperial University at Tokyo, married a Japanese woman and adopted the Buddhist religion. Henceforth he became known as YAKUMO KOIZUMI. It was this close association with Japanese life that enabled him to write those classic interpretations which now enrich literature, among them *Japanese Letters of Lafcadio Hearn, Glimpses of Unfamiliar Japan; Japan, An Attempt at Interpretation,* and *An Interpretation of Literature.*

HEARNE, *hurn,* SAMUEL (1745-1792), a Canadian explorer and trader, for many years an employee of the Hudson's Bay Company, whose advance from the shores of Hudson Bay

into the great interior is generally credited to him. He was stationed at Fort Prince of Wales, at the mouth of the Churchill River; while there, some Indians from the far north came in to trade and displayed large pieces of copper which they had found on the banks of a "great river." Several months later, in 1769, the company decided to investigate the stories told by the Indians and chose Hearne to lead an exploring party. Hearne's orders were to go as far as 70° north latitude, to smoke the calumet of peace with the Indians, to take astronomical observations, to reach this river abounding with copper and "animals of the fur kind," and finally, if possible, to determine the existence or nonexistence of the Northwest Passage. After two unsuccessful starts, Hearne succeeded, in July, 1771, in reaching the mouth of the Coppermine River. After many hardships he again reached Fort Prince of Wales in June, 1772. Considering the difficulties of the country through which they passed, the achievement of Hearne was a notable one, and it was of greatest importance because it established friendly relations with the Indians from the shores of Hudson Bay to Lake Athabaska. G.H.L.

HEARST, *hurst,* WILLIAM HOWARD (1864-), a Canadian barrister and statesman, long known for his efforts to develop Northern Ontario. He was one of Sir James P. Whitney's chief lieutenants, and his successor as premier of Ontario. He was born in Bruce County, Ont., attended the local schools and Collingwood Collegiate Institute, and in 1888 was called to the bar. Though he soon took an active interest in political life, he held no office until 1905, when Whitney appointed him a special government agent in connection with the Guarantee Loan & Lake Superior Corporation's affairs. In 1908 he was elected as a Conservative to the Ontario legislature, and in 1911 was appointed provincial minister of lands, forests and mines, a position in which he secured the enactment of practical mining laws needed for the development of the Cobalt district and other sections. As premier of the province, after 1914, Hearst proved himself an energetic worker and an eloquent speaker. See, also, ONTARIO, subhead *History.*

HEARST, WILLIAM RANDOLPH (1863-), an American newspaper-owner, editor and politician, and one of the best-known publishers in the world. He is the only son of former United States Senator George Hearst of California, a "Forty-niner," as the gold seekers of 1849 were called, and one of the "bonanza kings" of California. The son was educated at Harvard University, where he became interested in college newspaper work, and before his graduation was editor-in-chief of the *Harvard Lampoon.*

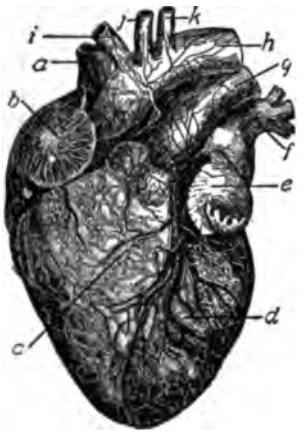
Given his choice of his father's many holdings, he chose a newspaper in San Francisco, which the family had acquired for political reasons. This paper, the *Examiner,* became a financial success after many thousands of dollars were spent; then Hearst's ambitions turned towards New York. He bought the *Journal,* upset all traditions and violated old precedents, and made his paper profitable in a short space of time. He has since added the New York *American;* the Chicago *American* (evening) and *Examiner* (morning); the *American* in Boston, afterwards abandoned, and, later, the *Examiner* in Los Angeles. Besides these periodicals, he publishes several widely-read magazines—*Hearst's, Motor,* and *Good Housekeeping*—and a Hebrew newspaper (New York) that has a larger circulation than any other Jewish paper in the United States. He was elected to Congress by the largest majority ever given a candidate in New York City, was an unsuccessful candidate for the Democratic nomination for President of the United States in 1904, and in 1905 was defeated for the mayoralty of New York City on the municipal ownership ticket. In 1906 he was defeated in his ambition to become governor of New York, after having been nominated by an independent party.

HEART, the great living pump by which the blood is driven through all parts of the body for the purpose of carrying nourishment to its cells. It is a tireless organ, working day and night from before birth until the end of life, and stops to rest only between its strokes, familiarly called "beats." The heart of the tiny baby beats 120 times a minute, that of a child of seven, ninety times, and that of an adult between seventy and eighty times—seventy-two being the average.

It is interesting to estimate the amount of work done by this busy machine. At the rate of seventy strokes a minute it beats nearly 37,000,000 times a year. About six ounces of blood are moved at each stroke, making a total of eighteen pounds a minute, twelve tons a day and 4,380 tons a year. The work done each day by the heart corresponds to that performed by a man of average weight in running up a flight of forty steps forty times, or

mbing a mountain 2,500 feet high. The expended by the heart in one hour would a man weighing 160 pounds seventy-two A day's work of this wonderful organ has computed to be equal to that of about rse power.

cription. The heart is a flattened, pear- d pouch about the size of a closed fist, ging five and one-half inches from base ex and three and one-half inches across road surface. In men its approximate t is eleven ounces; in women, nine s. It lies obliquely within the chest, with oader end, or base, in the direction of the shoulder and its apex pointing downward, rd and toward the left. As the lower can be felt beating the more easily, for ch stroke the narrow end strikes against all of the chest, it is commonly believed the heart is on the left side of the body. he contrary it lies very nearly in the le line. The narrow end can be felt beat- f the hand is placed between the carti- of the fifth and sixth ribs to the left of reastbone. The larger end extends along ight side of this bone upward to the third The whole organ is enclosed in a bag embrane called the *pericardium,* and is rished by l conveyed t by the *ary* arteries. e heart is iously con- ted to pump different ms of blood e same time, is divided) right and avities, with pening what- in the mus- partition h runs down center from to bottom. of these ies is in turn led into an r and a lower ber, called ctively right and left *auricles* and right left *ventricles.* All four chambers have e, muscular walls, but those of the ven- s are much the stronger and thicker.



FRONT VIEW

(*a*) Superior vena cava
(*b*) Right auricle
(*c*) Right ventricle
(*d*) Left ventricle
(*e*) Left auricle
(*f*) Pulmonary vein
(*g*) Pulmonary artery
(*h*) Aorta
(*i*) Right subclavian artery
(*j*) Right carotid artery
(*k*) Left carotid artery

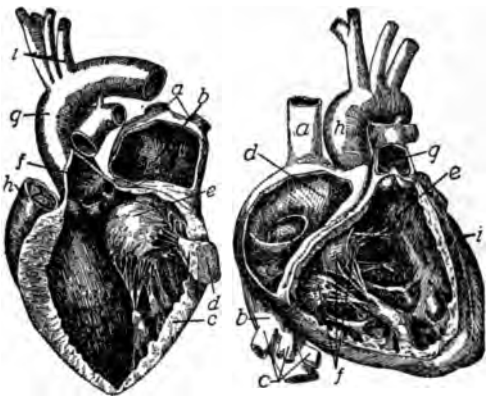
because the latter are the pumping chambers of the heart and do the harder work. Furthermore, as the left side pumps blood throughout the body, and the right side only through the lungs, the walls of the left ventricle are three times as thick as those of the right ventricle.

Circulation in the Heart. This section should be read with reference to the article CIRCULATION OF THE BLOOD, page 1387, where there is a color plate. The auricles are the receiving chambers of the heart, the ventricles the delivery rooms. The blood which is to circulate through the lungs enters the right auricle through two large veins, the *venae cavae.* From the right auricle it is forced by the contraction of the walls of that chamber into the right ventricle, passing through an opening guarded by a valve consisting of three little triangular flaps of membrane (*tricuspid* valve). This valve is so constructed as to permit the blood to flow into the ventricle, but prevents its flowing backward, acting something like double-swinging doors which open in but one direction. Between the left auricle and left ventricle is a similar valve having two flaps, and called, because of its resemblance to a bishop's miter, the *mitral valve.*

When the right ventricle is filled its muscles contract and squeeze the blood into the *pulmonary artery,* which leads to the lungs. The walls of the auricle, at the same time, are relaxing and receiving another supply of blood. The pressure exerted by these movements closes the tricuspid valve and opens three valves between the ventricle and the pulmonary artery. These are called *semilunar valves,* because they are shaped like half-moons, and they are also so constructed as to prevent the blood from flowing backward. When all of that fluid is expelled from the ventricle its walls relax and the semilunar valves close. The blood then flows into the lungs, where it goes through a purifying process, returning to the left auricle through the *pulmonary veins.*

Now begins the circulation of the purified blood through the left side of the heart. From the left auricle the blood passes into the left ventricle through the mitral valve, and out of the left ventricle through another set of semilunar valves into the largest artery in the body, the *aorta.* This artery, by means of its numerous branches, sends the blood to all parts of the body; when the circulation is completed it is returned to the right auricle to start again on its journey through the lungs. It requires only about half a minute

for a drop of blood to make the entire round of the circulation. An interesting feature of this process is the fact that the two sides of the heart, though doing different work, contract and empty themselves and relax and fill



AT LEFT

The left auricle and ventricle opened. A part of the left and anterior walls has been removed.
(*a*) The two right pulmonary veins cut short; their openings are seen within the auricle.
(*b*) The cavity of the left auricle. The larger cavity, below and to the left, is the ventricle.
(*c*) The cut surface of the walls of the ventricle seem to become very much thinner toward the apex.
(*d*) A small part of the anterior wall of the left ventricle which has been preserved.
(*e*) The mitral valve, which prevents the return of the blood from the ventricle to the auricle.
(*f*) Showing the interior of the aorta, near its commencement and above the three segments of its semilunar valve, which are hanging loosely together.
(*g*) The exterior of the great artery or aorta.
(*h*) The root of the pulmonary artery and its semilunar valves.
(*i*) The arteries rising from the summit of the aortic arch.

AT RIGHT

The right auricle and ventricle opened. A part of their right and anterior walls has been removed.
(*a*) Superior vena cava.
(*b*) Inferior vena cava.
(*c*) Hepatic veins cut short.
(*d*) Right auricle.
(*e*) Cavity of the right ventricle.
(*f*) Tricuspid valve.
(*g*) Showing the interior of the pulmonary artery, a part of the anterior wall of that vessel having been removed, and a narrow portion of it preserved at its commencement, where the semilunar valves are attached.
(*h*) The ascending part or sinus of the arch of the aorta.
(*i*) The outside of the left ventricle.

at the same time. Therefore only one beat can be felt. With each stroke there is a wave of swelling in the walls of the arteries throughout the body, which can be felt as a distinct beat or throbbing in places where the artery lies near the surface.

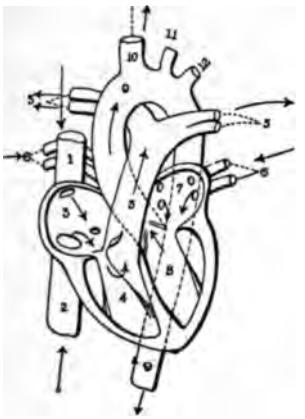
Sounds of the Heart. Two different sounds are made by the heart as it carries on its labors. The first, supposed to be caused by the vibration of the contracting muscles, is a dull, muffled sound which can be imitated by pronouncing the syllable *lub;* this is followed by a shorter and sharper sound—*dup*—which is due to the sudden closing of the semilunar valves. The first sound continues during three-tenths of the beat, and is followed by a pause lasting one-tenth; two-tenths are next taken up with the second sound, and then there is a pause lasting four-tenths of the beat. If you place your ear against the chest of a person, over the region of the heart, you can hear these sounds distinctly. When the valves are diseased and do not work properly the condition is indicated by a sort of blowing sound. That is why the physician listens to the sounds of the heart when he suspects that these valves are out of order.

Care of the Heart. If this active pumping organ did not possess strong powers of endurance it could never endure the strain to which it is constantly subjected. The heart works for all the other parts of the body; the stomach calls for a larger supply of blood to help it in digesting the food; the brain cells need more blood when we are studying or thinking hard; when we engage in active forms of work or exercise the heart must beat faster to provide us with the necessary energy. Furthermore, its nerve cells are very sensitive and respond quickly to outside influences. A sudden, unexpected outcry, for instance, makes it beat faster; its action is hastened by anger, joy, excitement, etc. Thus it is seen that there are numerous demands made upon the heart every day; for this reason we should not overdo in our work or in our play. Outdoor exercise, if it is kept within the proper limits, is excellent for building up the physical organism and for strengthening the heart, but overindulgence in athletic sports may bring on permanent weakness of that life-sustaining organ. It is a good rule to stop active exercise when you begin to feel tired or when the heart begins to beat too violently.

All kinds of alcoholic liquors have a harmful effect on the heart. Long-continued use of these beverages may cause a deposit of fatty tissue in place of muscular fibers, a condition known as "fatty degeneration." This interferes with the work of the ventricles and valves and may cause death by heart failure. Alcohol is a direct poison to the cells of the heart; it overstimulates that organ and causes it to beat with needless vigor, and it weakens it by impairing the nutritive qualities of the blood which nourishes it. In many states and

provinces the laws require that pupils in their physiology classes be taught the harmful effects of strong drink.

The use of tobacco is also to be condemned. A surgeon-general of the United States army has reported that candidates for West Point who are annually rejected because of irregularities of the heart's action are nearly all users of tobacco. Plenty of wholesome, nutritious, digestible food and abstinence from alcohol and tobacco will help to keep the heart strong and active.



COURSE OF THE BLOOD
(1, 2) Superior and inferior venae cavae
(3) Right auricle
(4) Right ventricle
(5, 5, 5) Pulmonary veins
(6, 6) Pulmonary veins
(7) Left auricle
(8) Left ventricle
(9) Aorta
(10) Innominate artery
(11) Left carotid artery
(12) Left subclavian artery

Diseases of the Heart. The term *heart disease* includes several maladies of the organ itself, and also various irregularities in its action due to disease in other parts of the body and to wrong habits of living. Palpitation of the heart, in which the pulse beats may number 150 or more a minute, may be produced by certain nervous disorders, by overindulgence in stimulants or by excessive physical or emotional strain. Heart spasm is an acutely painful malady supposed to be caused by disease of the coronary arteries. Poisons in the blood, which affect the muscles, lining or valves of the heart, are responsible for a number of diseases peculiar to that organ. Important among these are *myocarditis,* inflammation of the muscular layer of the heart walls; and *endocarditis,* inflammation of the lining membrane. The latter very often is a complication of rheumatism, but is also caused by scarlet fever, pneumonia and other infectious diseases. As in endocarditis the inflammation is usually confined to the membrane which covers the valves of the heart, this malady is often known as *valvular* heart disease. Sometimes the valves become stiff and obstruct the flow of blood, and sometimes the flaps become so shortened by contracting that they allow the blood to flow backwards even when the valves are closed. The latter condition is called *regurgitation,* which means *passing backwards.*

Pericarditis is inflammation of the bag enclosing the heart, causing that membrane to become thickened and roughened, and often seriously impeding the heart's action. Enlargement of the walls of the heart (hypertrophy), in which the weight of the organ sometimes increases to two or three pounds, may be caused by mountain climbing or by emotional strain. This condition also frequently follows kidney trouble. It is not as a rule dangerous, but becomes so if fatty degeneration also takes place. Compared with other diseases, those of the heart are not a frequent cause of death. Even a person who has chronic valvular trouble may expect to live his allotted number of years if he avoids violent exercise, controls his emotions, eats wholesome, nutritious food and avoids stimulants and narcotics. S.C.B.

Related Subjects. A better understanding of the heart and its work may be gained from the following articles:

Angina Pectoris	Circulation of the Blood
Aorta	Membranes
Arteries	Pericardium
Blood	Pulse
Capillaries	Veins

HEAT. Everyone is familiar with the sensations produced by what are termed *heat* and *cold.* The study of these so-called "heat-effects" and of the laws according to which they are produced forms what is known in physics as *heat.*

What Heat Is. Every substance, whether solid, liquid or in the form of gas, consists of a great number of small particles called *molecules.* These molecules are constantly in motion, and *heat* is the energy produced by the agitation of these molecules. When their motion is very rapid, a substance is said to be *hot;* when it is less rapid, the substance is said to be *cool* or *cold.* The point at which all molecular motion would cease is called *absolute zero,* but this is purely theoretical—it is a degree of coldness that has never been reached.

Where Heat Comes From. (1) Most of the energy or heat that is available for use comes either directly or indirectly from the sun. All plant life and all animal life depend for their existence on this great, white-hot ball around which our world revolves. If the sun, which is estimated to have a temperature of about 10,000° F., should cool, all life would be extinguished and the earth would become a cold, dead mass like the moon.

(2) Hot springs and volcanoes supply heat, and are proofs of the belief that the interior of the earth has a very high temperature.

(3) Electric currents are another source of heat. Whenever an electric current passes through a substance, its temperature is raised. The hottest furnaces in the world are the electrical furnaces at Niagara Falls; these have a temperature of about 7,000°, or more than twice the heat of boiling steel. Flames as hot as these cannot be produced in a blast furnace because they consume iron containers and tools as though they were paper and reduce fire brick to the consistency of putty.

(4) Such mechanical actions as *friction* and *compression* produce heat. An English scientist, Sir Humphry Davy, in 1810, demonstrated that two pieces of ice could be melted simply by rubbing them together. It was then that the idea first began to prevail that heat could be produced by mechanical work. Water can be heated by friction until it boils. A piece of wood may be set on fire by friction. Many a hunter or trapper has resorted to the device savages employ of obtaining a flame by twirling a pointed stick in the hollow of a dry piece of wood. A piece of metal may be heated by striking it or by rubbing it against another surface. Every child has probably heated a penny by rubbing it on a carpet or has burned his skin sliding down a rope.

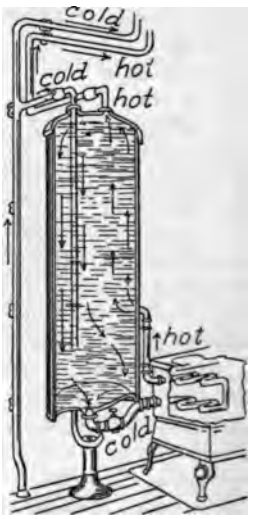
The other mechanical means of producing heat is by *compression,* and this is a well-known heat effect. If a gas is compressed its temperature is raised. But here, just as in the heat-effects produced by friction, *work* is required to produce heat, and in each case the amount of heat produced depends on the amount of work done.

(5) Many chemical actions, such as the combustion (burning) of substances like carbon and oxygen, produce heat. An ordinary flame is the result of the combustion of these two elements. It is the combustion of carbon and oxygen that produces the heat of our bodies. Carbon is one of the waste products of the body, the result of the breaking down of cells which occurs with every movement. When this carbon comes in contact with the oxygen supplied by the lungs, heat is produced. This is the reason that, if you work very hard and fast, or run rapidly, you get warm.

(6) Changes in the arrangement of the molecules of which matter is composed will produce heat. When water freezes, heat is given off. A tub of water is sometimes placed in a conservatory on a night when frost is expected, because, as the water freezes, it gives up heat energy to the surrounding room, or "takes the frost out of the air," as the household doubtless expresses it.

How Heat Travels. Energy or heat is transferred from the molecules of one body to those of another in three ways: by *convection,* by *conduction* and by *radiation.*

Convection. In this process of heat transference the molecules of the body whose temperature is raised move away to other places in the body and thus tend to raise the temperature of the entire body. The molecules of solids cannot move about from place to place, so convection is limited to fluids. If a vessel of water, or any other liquid, is placed over a fire, the portions of the liquid near the bottom become hot and so expand and become lighter, or less *dense,* than the rest of the liquid. This causes them to move upward toward the top of the liquid, and thus the heat is transferred. The process of convection is of great importance in the drafts in chimneys, ventilation, in hot-air, hot-water and steam-heating plants, and in the great phenomena of nature, such as winds and ocean currents. When a fire is started in a fireplace, the air in the chimney becomes heated and begins to rise and the cold air pushes in from below, forming the so-called *draft* along the floor and up the chimney. You can see why the draft is not very great when the fire is being started and why it increases in strength as the fire gets hotter.

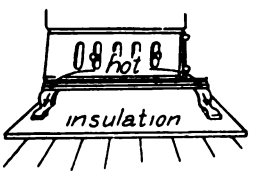


BY CONVECTION

When the water in the coils within the stove is heated it becomes less dense—that is, lighter; this causes a current within the tank, and eventually all the water in it becomes heated.

Conduction. In conduction the separate portions of matter do not move away bodily, but the vibrating molecules hitting against each other pass the energy from one portion to another. If a poker has one end in the fire, that

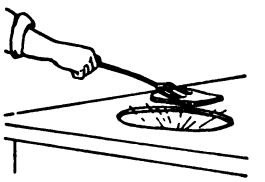
end becomes hot; that is, the molecules begin to move rapidly. In moving rapidly they hit against the molecules next to them and this raises the temperature of the next part, and so on down the entire length of the poker. One of the most interesting examples of the power of metals to conduct heat is the safety lamp which miners use. One of the great dangers in mines is that of explosions. But the miners must have light, and so are obliged to carry lamps. These lamps are made safe by surrounding the flame with a screen of metal gauze and solid metal pieces. The surrounding metal conducts the heat of the flame away and actually makes the flame cooler, so that it cannot set fire to anything. It has been found by experiment that all solids that can conduct electricity are good heat conductors. Silver and gold, copper and iron, steel and aluminum, are very good heat conductors. Stone, glass and paper are poor conductors. Mercury is the only good conductor among the liquids. Water is poor, and so are all gases, including air. The asbestos coverings on locomotive boilers and steam pipes are poor conductors of heat, and are put on to prevent its escape. Wool is a poor conductor, whether in its natural state on a sheep's back or made into garments. Air is so poor a conductor that air spaces are left between the walls of refrigerators to dispute the passage of heat. The reason that down comforters are warm is that the air entangled with the down keeps the heat from escaping. Wood is a poor conductor, and that is why it is used for handles on pots and pans.



BY CONDUCTION

The feet of a stove may serve as an example of heating by conduction. The underside of a stove and the feet become very hot, because iron is a good conductor of heat. The stove must be set on a platform made of some substance through which heat passes less readily, to prevent scorching the floor.

Radiation. In both of the processes of heat transference that have been described, the substance heated is in contact with the body that heats it. But there must be some other process of transference, for we all know that a hot stove will heat any object that is near it. We know that cloth can be scorched or burned without touching the stove. We know that the heat from the sun somehow succeeds in reaching the earth. This process is known as ***radiation***. Through radiation heat is transferred from one point to another by means of waves. These waves can transfer heat across a vacuum or from the sun and stars to the earth. Therefore there must be some medium which fills all the spaces, large and small, in the universe. This medium is called *ether* (see ETHER).



BY RADIATION

One illustration of heat traveling by radiation is shown in the preparation of toast. Heat is carried from the fire by the ether waves.

Just as water waves spread out in rings from the spot where a stone falls into a pool, so heat waves spread in all directions from the vibrating molecules of hot bodies; and just as water waves break and give up their energy to pebbles on the shore of the pond, so the heat waves strike and give up their energy to particles of matter in their vicinity. Suppose the fire in the stove is reduced so that the temperature of the stove falls as low as that of your body. The stove does not cease to send out heat waves, for if we put a piece of ice near the stove it will melt. As a matter of fact, the stove will continue to send out heat waves until it becomes of the same temperature as the air of the room and of all the objects in it. Then, if the temperature of the room is raised, the stove, in common with other things in the room, will begin absorbing heat. This is true of all bodies; they are either radiating heat or absorbing it at all times. If, in a given time, the amount of energy that a body absorbs is greater than that which it radiates, its temperature rises, while if the amount of energy that it absorbs is less than that which it radiates, its temperature falls. This principle is known as *Prevost's theory of exchanges.*

What Heat Does. Among the most familiar heat effects are change in volume, change in temperature (which has been discussed), and change in molecular arrangement, such as melting or boiling.

(1) *Makes Bodies Larger.* If any solid body is warmed over a fire or in other ways, it becomes larger. This is the theory on which an ordinary thermometer is made. A bulb connecting with a slender tube is filled with mercury, which is a good conductor of heat. When the temperature of the air rises, the mercury expands and rises in the tube. In laying railroad tracks, this property of steel has to be taken into account. The rails, if they are laid

when the weather is cool, must not be put exactly end to end. A space has to be left between the ends so that in the summer, when they are heated, there will be room for them to expand. Wagon tires are made just a little smaller than the rim of the wooden wheel and are heated until they expand to the proper size to fit on the wheel. When they afterwards cool they contract and draw the whole wheel tightly together. (See EXPANSION.)

(2) *Changes Solids to Liquids.* If ice is brought near a flame, instead of getting hotter it melts, or changes to water. This requires a greater amount of heat in some cases than it does in others. Ice is only thirty-two degrees "cold," and immediately begins to melt if surrounded by warmth. Metals also become liquid if they are heated to a sufficient temperature. Lead does not have a very high melting temperature, and can be changed to a liquid over a hot gas flame. The melting, or fusing, point of lead is only 585 degrees, but that of most metals is very high. Platinum has such a high fusing point that it can only be melted in an electric furnace.

(3) *Changes Liquids and Solids to Vapor.* When liquids are heated to the boiling point they pass into a gaseous condition. There are some substances which, when they are heated, will pass directly from a solid to a gaseous state, camphor and zinc and snow among them. But while melting cannot begin until the temperature of the solid is raised to a definite degree, the process of *evaporation* is going on all the time from the surface of a liquid, no matter what its temperature. Clothes hung out to dry on a cold day will "freeze" dry. A vessel of water in the open air will be emptied by evaporation without ever reaching the boiling point.

(4) *Produces Light.* When certain substances are raised to a very high temperature, they give off light as well as heat. The example with which most people are familiar is that of some iron object which becomes *red-hot,* or even *white-hot,* such as a glowing coal or a flame. This property of matter has been utilized in the Welsbach gas burner, where, instead of getting light from the gas flame, the light comes from a cone of metal which is heated white-hot by the flame.

Related Subjects. The following articles in these volumes bear more or less closely on the general subject of heat:

Combustion	Energy
Electric Heating	Evaporation
Electricity	Expansion
Fire	Radiometer
Freezing	Sun
Heating and Ventilation	Temperature
Molecule	Thermometer

HEATH, *heeth,* or **HEATHER,** *heth'er,* the name of various modest evergreen shrubs common in Europe and Africa. The term also applies to large waste places on which such shrubs grow. In this latter connection the term is seldom used in America, where shrubs of heather are rare. In recent years, however, the hardy Scotch heather has become a popular plant and cut flower in American flower shops, it having been introduced in a few places in Eastern United States. It has low, grayish, hairy stalks, broomlike branches, needlelike leaves and spikes of tiny, purple-rose, bell-shaped blossoms. A similar species is common in moors and on large tracts in Great Britain and in continental Europe, and is called *ling.* Heather flowers are rich in honey, and Mary Howitt, in *Autumn,* says:

> Oh! beautiful those wastes of heath
> Stretching for miles to lure the bee.

The flowers of either the cross-leaved or the fine-leaved heath of the British Isles are the heather-bells of Scotch songs and stories, and they inspired Scott to write in the *Lady of the Lake:*

> For heath-bell, with her purple bloom,
> Supplied the bonnet and the plume.

Practical Uses. Most of nearly 400 known species of heather are native to Africa, where many are remarkable for the size and beauty of their blossoms. In European countries the uses of heather are numerous. It is used in making brooms and brushes, and trailing shoots are woven into baskets. The underground rootstocks of a species common in France yield the briarwood used for pipes. Heather seeds are eaten by many birds. Poor people in Scotland use heather for thatching their houses. In some places a liquid made from heath is used in tanning leather. Young heather shoots are used for forage, and no sweeter, softer outdoor bed could be desired by the shepherd than one of heather branches. Heather contributes greatly to the formation of peat bogs, and in that way it is of economic value as well as a thing of beauty in those desolate places. See PEAT.

Although true heaths are not common in America, many familiar plants represent the heath family in that country; among these are the cranberry, huckleberry, rhododendron, azalea and trailing arbutus. All are described elsewhere in these volumes. M.S.

AT'ING AND VENTILATION, *ven ti la'* Heating is the process of keeping living at such a temperature that they may r human beings in comfort. Ventilation means by which the same space is sup- with fresh air in such measure and by means as shall be conducive to continued . To state it somewhat more pointedly, the object of heating is not only to make a building or a room warm, but to make it healthful; while the object of ventilation is to keep it healthful. The principles upon which these arts depend are so mutually involved that they are considered as one sanitary and engineering problem, and will be so considered in this article.

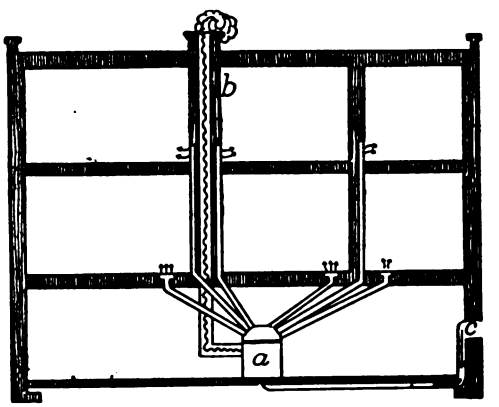
The Heating Problem

human body needs to be kept at a rature of 98.2° F. in order to sustain rocesses; it loses heat in a cooler medium, me as any other kind of matter. Food oper chemical proportions creates heat, lothing helps the body to retain it; a n can therefore live in comfort in tem- res considerably below body heat. In ern Europe people are accustomed to a rature a little below 60°, while in the d States and Canada about 68° to 70° ally demanded. The thermometer marks "temperate," and doubtless those people ccustom themselves to such a tempera- are more robust than others who insist warmer air in their rooms.

tendency of masses of air at different ratures is to equalize their temperature. quently the air in a room artificially d tends to lose heat until it reaches the rature of the outside air unless addi- warmth is continually supplied. The ty with which the heated air escapes is an important factor in maintaining the rature. If it escapes freely the tempera- of the room is lowered more quickly than scapes slowly. Heat is lost through win- ; three-fourths of what is lost in that way be saved by double windows. A fire s air currents, and much heat is lost by means before it can affect the tempera- some escapes through cracks around and windows, and more by proper ven- n. It is the problem of the householder ovide sufficient heat to offset these losses naintain an even, healthful temperature; one has done so he has practically mas- the science of heating.

e temperature of a room is raised in of two ways. One method, known as *di- adiation,* is the heating of air already in oom by means of stoves and fireplaces, r radiators connected with pes which ct hot water or steam produced in fur- . The other, *indirect radiation,* consists in bringing into the room air which has been warmed by being passed over a central heated surface, such as a coil of steam or hot-water pipes.

The commonly-used hot-air furnace provides warmth by means of indirect radiation, for the air is first heated by circulating between the inner part of the furnace, where the fire burns, and the outer casing, and is then conveyed through large pipes or flues to the various rooms, which are provided with registers.



HEATING BY FURNACE

(*a*) Furnace, with pipes running to all rooms of the building. (*b*) Chimney. (*c*) Cold-air entrance to furnace from outside. The arrangement of pipes in a system employing steam or hot water is substantially the same, each pipe running to a coil of pipes in a room, such coil being known as a radiator.

The hot-air furnace provides both heat and ventilation, for a supply of fresh air from out-of-doors is being continually brought to the furnace through a duct which connects with the outer casing. The indirect method of heating is the more sanitary of the two systems; direct radiation may warm air which is already foul and thus prove a source of danger to health.

The drying tendency of any heating appliance should always be considered. The air in a room cannot be healthful unless it contains a certain proportion of moisture, and in homes

where direct-radiation systems of heating are used it is advisable to place a pan of water on a radiator in each room. The air is thus supplied with moisture by means of evaporation. There are now on the market patent devices which accomplish this end. When the indirect-radiation system is employed the furnaces are equipped with evaporating pans which should be kept full of water.

Hot Water and Steam. In modern buildings and residences steam and hot-water heating have largely superseded the hot-air system. Though more expensive to install, steam and hot-water plants can be operated with more economy of fuel than the old type of furnace. They give better satisfaction, for they provide heat more uniformly; they are also cleaner, and the central heating body is unaffected by the direction or violence of the wind. The latter is probably the most serious limitation of the hot-air furnace.

The essential parts of the hot-water and steam plants are a hot-water heater or steam boiler, a furnace, a system of pipes and radiators. In the one case water is circulated through the pipes when it has reached a temperature of 140° F.; steam is circulated under pressure at a temperature of 212° F. In the water system heat is obtained as soon as the water is warmed, while with the steam system no heat is available until the water in the boiler has developed sufficient pressure to circulate through the pipes. Hot-water heat, however, is not so quickly shut off as steam heat. The water system has the advantage of operating noiselessly; steam when first turned on usually makes itself heard. In point of cost, a steam plant is less expensive to install than the hot-water, but is more expensive to operate.

Both systems may provide heat by direct or by indirect radiation. If the direct method is used, the radiators are placed in the rooms to be warmed; if the indirect method is employed, they are located in the air passages leading to the rooms. When direct radiation is employed the ventilation of the building should receive very careful attention.

Electric and Gas Heating. Since 1895 electric heaters have been quite generally used for heating street-cars. Though expensive to operate, they are by far the most convenient heating devices for local transportation. In this system heat is developed by the passage of an electric current through a conductor that offers great resistance (see ELECTRIC HEATING). Gas may be burned in fireplaces, stoves or furnaces, but in most localities it costs too much to supersede coal as a fuel. Gas heaters, which may be attached to the ordinary lighting jet, and gas fireplaces are often found in homes where coal is regularly burned, and they are very much appreciated when a sudden change of weather brings discomfort, especially during the season when the furnace is not in use. The great objection to gas as a fuel is that it consumes too much of the oxygen in the air. See GAS. E.D.F.

The Ventilating Problem

The ventilating problem is a twofold one, involving the expulsion of impure air as well as the admittance of fresh air. Air becomes foul in a room containing human beings, because the lungs and skin are continually throwing off waste matter (see SKIN; BREATH). Unless there is a constant circulation of air in a room, such a room speedily becomes an unwholesome place in which to stay. It has been estimated that the supply of fresh air for each person in an ordinary living room should be not less than 1,800 cubic feet per hour. In a room fifteen feet long, twelve feet wide and ten feet high there are exactly 1,800 cubic feet of space. If there are six persons in that room the air becomes foul unless it is changed six times an hour, or every ten minutes. It is not necessarily true that *cold* air is *fresh* air.

It is not enough in providing for the ventilation of a room to open the window from the bottom. Fresh air cannot enter unless the warm, impure air is allowed to escape; this may be provided for by lowering the sash from the top. Proper ventilation of the sleeping room is of highest importance. Even in the coldest weather all of the bedroom windows should be raised from the bottom and lowered from the top. Screens may be used if the wind happens to be too strong, and extra bedclothing if the weather is unusually severe. Sleeping in a properly-ventilated room is an excellent way to resist colds, and it makes for health, optimism and vitality.

It is obvious that in theaters, churches and other places of assemblage, where large numbers of people congregate, the allowance of fresh air per person should be greater than in

an ordinary living room. The following table, prepared by Dr. John S. Billings, an authority on heating and ventilation, shows what may be considered the ideal allowance for various buildings:

	CUBIC FEET OF AIR PER HOUR
Hospitals	3,600 per bed
Legislative assembly halls	3,600 per seat
Barracks, bedrooms and workshops	3,000 per person
Schools and churches	2,400 per person
Theaters and ordinary halls of audience	2,000 per seat
Office rooms	1,800 per person

The ventilation of the ordinary dwelling house is usually provided for by the natural interchange of air through doors and windows, and in some cases by a system of flues in connection with the heating plant. For supplying large buildings with fresh air it is now customary to install some mechanical system of ventilation. The system most generally adopted, known as the *plenum*, consists in forcing fresh air into the building by means of blowers or fans, placed in the air ducts.

Ventilation of Schools. The heating and ventilating system of the modern schoolhouse in large towns and cities is usually of the standard degree of efficiency, but many schools in rural districts and villages are built without any special devices for securing the admittance of fresh air and the escape of foul air. Pupils who must study for any length of time in a poorly-ventilated room become drowsy, restless and inattentive, and it is one of the teacher's most important duties to see that unwholesome conditions do not prevail in her room. The simplest device for securing proper ventilation is a board about eight inches wide, fitted to the casing under the lower sash. When the window is raised the board will force the air upward and prevent its blowing directly on any of the children. During recess and intermissions the room should be thoroughly flushed with fresh air.

Recirculated Air. Modern investigations have shown that the chief requirements in ventilation are to keep air constantly in motion and to prevent its becoming too dry. In some institutions, now, the air is circulated over and over again, but is constantly washed by being sent through a spray of water which takes out all dust and foul matter, and moistens it. This results in a great saving in fuel in winter, and it seems to meet all the requirements of health, especially when a small amount of outdoor air is constantly mixed with the recirculated air. E.D.F.

HEAVEN, *hev'n.* In religion the word applies to the region where God's immediate presence is manifested and where the angels reside. Among Christians the general belief since the resurrection of Christ has been that all who live good, pure lives on earth go to heaven after death. It is the place of everlasting life, and its joys are purely spiritual. Where this region is no one knows, although the expression of Jesus, "The kingdom of heaven is within you," has led to the idea that heaven is in reality a pure, spiritual condition of mind.

HEAVES, *heevz,* commonly known as BROKEN WIND, is a disease to which horses are subject. It is chiefly characterized by difficulty in expelling air from the lungs, and becomes very marked during exercise. Air is easily inhaled, but is forced out with heavings of the stomach muscles and general signs of distress. The nostrils become dilated, the eyes bloodshot, and the victim becomes incapable of long-continued effort. Although it affects the lungs, the disease probably arises from stomach disorders which act upon the nerves of the lungs. No certain cure is known; the use of camphor, digitalin, opium and other drugs produces only temporary relief. Change of diet is beneficial, and an oat-fed horse with a mild case of heaves may sometimes be cured if turned out to pasture or fed on laxative food, such as cornstalks.

HEAVYSEGE, *hev'iseej,* CHARLES (1816-1876), a Canadian poet best known as the author of *Saul,* the first important Canadian drama. He was born at Liverpool, England, where he worked for many years as a cabinet-maker. In 1853 he went to Canada, where he first worked at his trade and later wrote for a Montreal newspaper. His first work, *The Revolt of Tartarus,* appeared anonymously in the year of his arrival in Canada. Four years later appeared *Saul,* a poetic drama of exceptional merit; though uneven in execution, the poem is original in conception and contains many passages of striking beauty and power. Among his later work were *The Advocate,* a novel, and several dramas, including *Count Filippo; The Dark Huntsman; the Owl;* and *Jephthah's Daughter.* G.H.L.

HEBE, *he'be,* in ancient myth was the goddess of youth, who poured out the nectar with which the gods pledged each other. One day, upon a solemn occasion, she tripped and fell.

Then she was forced to resign her office, while her father, Jupiter, went in search of another cupbearer, finally kidnaping the beautiful youth Ganymede for the office. Hebe always retained the power of restoring the aged to the bloom of youth and beauty, and some accounts say that it was only after she became the wife of Hercules, who was deified, that she gave up her office of cupbearer. She even succeeded in reconciling her mother, Juno, to Hercules, who had suffered all his life from the hatred of the queen of the gods.

Haste thee, Nymph, and bring with thee,
Jest and youthful Jollity,
Quips, and Cranks, and wanton Wiles,
Nods, and Becks, and wreathéd Smiles,
Such as hang on Hebe's cheek,
And love to live in dimple sleek;
Sport that wrinkled Care derides,
And Laughter holding both his sides.
MILTON: *L'Allegro.*

HE'BER, REGINALD (1783-1826), a bishop of the English Church, and a famous author of hymns. He wrote the great missionary hymn, *From Greenland's Icy Mountains,* while spending Sunday with a fellow-clergyman; a special offering had been asked for missions and his friend begged him to write something for the occasion. It is said the hymn has been translated into more languages than any other religious song. The gift for versification showed itself early in Heber's life. His prize poem *Palestine* owed one of its most striking passages to Sir Walter Scott's suggestion, and has won a permanent place in poetic literature. When he was forty years of age he was called to the bishopric, and his literary life was closed. He was one of the first bishops that the English Church sent to India, and he baptized the first native to embrace Christianity. Among his best-known hymns are *Holy, Holy, Holy, Lord God Almighty; Creator of the Rolling Flood; Lo, the Lilies of the Field; There was Joy in Heaven; O, King of Earth and Air and Sea.*

HÉBERT, *a bair',* LOUIS PHILIPPE (1830-), a Canadian sculptor, noted for his statues of great Canadians. He was born in the province of Quebec, and as a boy worked on a farm. During his leisure moments he indulged his inclination for carving in wood, and in 1873 won a prize at a Montreal exhibition. Soon afterwards he began to study sculpture in a Montreal studio, and after five years of hard work spent a year in Paris for advanced study. Returning to Canada he first received public notice by winning a prize offered by the Dominion government for a statue of Sir Georges E. Cartier, which now stands in Parliament Square, Ottawa. Among his other works are the statues of Alexander Mackenzie and Sir John A. Macdonald, both at Ottawa, the Maisonneuve and the Laval monuments at Montreal, the Champlain Monument at Quebec, and the Joseph Howe statue at Halifax.

HEBREW, *he'broo,* **LANGUAGE AND LITERATURE,** the spoken and written language of the Hebrews during the greater part of their existence in Palestine, and which, revived at various epochs in the history of the Jews, survives to the present day. Hebrew belongs to the group known as the Semitic languages and has all the characteristics of the group, such as the use of consonants to form the basis of stems, with vowel changes to form the modifications which lead to verb conjugation and noun declension. The alphabet, just as the old Canaanitish or Phoenician, is composed of twenty-two consonants. The vowels are expressed by marks above or below these letters. The present form of Hebrew is a modification of the old Phoenician characters. The writing, as in the case of most Semitic languages (not of all), is from right to left, opposite that of the method employed in English.

History. The history of the Hebrew language and its literature may be divided into four periods. First was the *Biblical period,* extending roughly from 1000 B.C. down to the threshold of the present era. Up to the time of the so-called Babylonian Exile (685 B.C.) Hebrew was the common language of speech and writing, and this language was identical with the tongue spoken by the Canaanites at the time that the Hebrews invaded the

country and gradually drove the Canaanites out of their possessions. After the Exile, *Aramaic,* closely allied to Hebrew and yet a distinct language, became the current medium of communication, while Hebrew became more a learned and a classical language, the language used in the cult and in religious literature.

The second period may be called the *Rabbinical,* because of the predominance of the Rabbi as the priestly guide of the people. The great production of Rabbinical Judaism was a vast collection of laws and commentaries known as the *Talmud.* In this compilation the laws themselves, known as the *Mishna,* were written in Hebrew, whereas the commentaries *(Gemara),* representing discussions of the Rabbis on the laws, were in Aramaic, the current speech even among the learned classes. Besides the *Mishna,* there are great collections of homiletical expansions of the Biblical books, corresponding in a measure to modern sermons, which were likewise written in Hebrew. This second period extends to about the seventh century.

Under the influence of the Mohammedans, spreading throughout the East and extending into Western Europe, the Jews in many lands adopted Arabic as their language, and as a consequence, beginning with about the eighth century and reaching to the twelfth, there is a considerable body of philosophical, poetical, grammatical and legalistic literature by Jews, as well as translations of the Old Testament into Arabic. During all this period, however, Hebrew never died out as a classical language, for it was spoken at least by the educated among the Jews in all lands, and, with the check to the further extension of Mohammedanism and the spread of the Jews to such lands as France, Germany, England and Holland, which were not touched by the Mohammedan movement, it was not long before the use of Hebrew as a medium of communication between Jews of various lands naturally led to renewed interest in the old historical speech.

The *third period* in the history of Hebrew extends from the Middle Ages down to the end of the eighteenth century. Most of the literature produced in this period was of a theological character—commentaries and supercommentaries to the Old Testament, to the *Mishna* and *Gemara,* ritual compilations, grammatical works, religious and, to a limited extent, secular poetry. With the gradual liberation of the Jews in the countries of Europe through the growth of democracy, Hebrew was replaced largely by the languages spoken in the countries in which Jews lived. It was natural that even during the centuries when the Jews of Europe had no rightful citizenship, they had adopted, for purposes of ordinary intercourse, the languages spoken in European countries. Now, with the advent of a new era, the language of the country became also the literary medium, and Hebrew retained its place only as the language of the ritual in the synagogues.

Within our own days, however, there has been a renewal of interest in Hebrew as current speech, which marks, therefore, the *fourth period* in the history of the language. That revival began in Russia a few decades ago, and has been largely aided by the spread of the Zionist Movement (which see). At the present time Hebrew is becoming more and more the common language of intercourse among the Jewish colonists who are settling in Palestine, while in such countries as Russia and Galicia Hebrew is also spoken in wide circles. It is doubtful, however, whether Hebrew will gain any foothold in Western or Southern Europe or on the American continent, where Jews take on the color of the life about them.

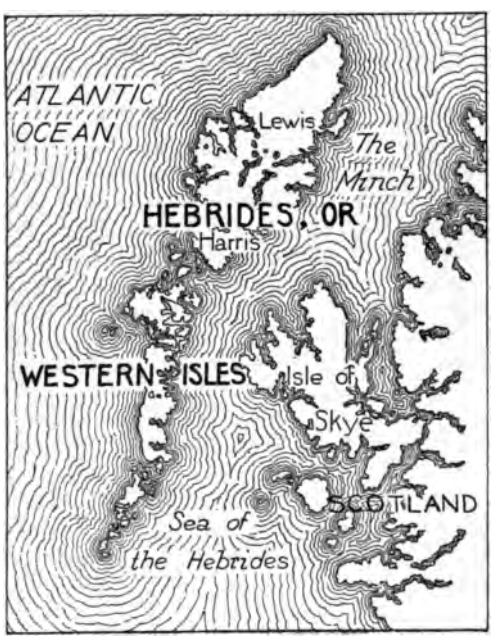
Naturally the most valuable section of Hebrew literature is that comprised in what is called the Old Testament. This collection, divided conventionally into thirty-nine books, embodies the early myths, the early and later traditions and the historical records of the Hebrews down to the period of the Exile, the orations of the great Hebrew prophets, extending from the ninth century to about the end of the fifth century, a great collection of religious poetry and such individual books as the *"Song of Songs," Ruth, Lamentations* and *Ecclesiastes.* A small section of the Old Testament is written in Aramaic, such as large portions of the book of *Daniel* and portions of the books of *Ezra* and *Nehemiah.* These productions, for this reason alone, belong to the post-Exilic period. The oldest specimens of Hebrew literature are the poetical bits in the Pentateuch and in some of the historical books, such as the "Song of Lamech," at the end of the fourth chapter of *Genesis,* the "Song of the Well" and martial ditties in the book of *Numbers* (chapter XXI), and the "Song of Deborah," in the fifth chapter of *Judges.* None of these productions, however, is older than 1000 B. C., while a great bulk of the Old Testament literature dates from the eighth

century to the end of the Babylonian Exile, and a century or so beyond that epoch. M.J.

HEBREWS, *he'brooz.* See JEWS.

HEBREWS, EPISTLE TO THE, one of the books of the New Testament. It is a letter addressed to the Jewish Christians of a certain church where the people were in danger of returning to Judaism. The author exhorts them to hold fast to their new faith, to which they were early converts, urging the thought of the High Priesthood of Jesus as replacing the Jewish priestly system. The letter, although addressed to a particular church, is a general appeal to the Hebrews to press on to the fullness of spiritual growth, since it is "by His faith that the righteous shall live." The authorship of the book has been much disputed; it has been attributed to Barnabas, Apollos, and others; the current view that it was written by the Apostle Paul is of late origin, and cannot be traced back further than the fourth century. M.J.

HEBRIDES, *heb'ri deez,* the "Western Isles" off the west coast of Scotland, is a group which long possessed a peculiar interest because of



THE HEBRIDES

the primitive customs and manner of life which prevailed after the neighboring regions became thoroughly civilized. In all, there are over five hundred of these islands, but some of them are mere dots on the surface of the ocean, and fewer than one-fourth are inhabited. The total area is 2,812 square miles, over two and a half times that of Rhode Island, and the population is about 80,000. Geographically, the islands are classified in two groups, the Outer and the Inner Hebrides; politically, they are divided among the four Scotch counties of Argyll, Bute, Inverness and Ross. Best known of the individual islands is perhaps Skye, far-famed for the little, long-haired Skye terrier, which originated there and was named for the island.

The people are not Scotch, but a more primitive people, who speak Gaelic and who have only in recent years come into any real contact with the rest of the world. Though the islands have belonged to Scotland since 1266, small attention was ever paid to them, and they were not better known than the cannibal isles of the South Pacific until Samuel Johnson visited them in 1773 and roused interest in them by his *Journey to the Western Isles.* Later Sir Walter Scott cast a glamour about them by his *Lord of the Isles,* and William Black in his novels made the world feel the peculiar charm of the rugged region he knew so well. To-day tourists flock to the Hebrides to enjoy the scenery, the climate and the picturesqueness of the people, no longer so unconscious as formerly, but of interest still; and wealthy sportsmen from Great Britain pay heavily for the privilege of shooting on the moors.

Mountainous in the main, the Hebrides present some wonderful scenery, most of it grand and picturesque rather than beautiful. The air is damp, but the climate, which is surprisingly mild because of the influence of the Gulf Stream, is very healthful. Sheep, cattle and horses, all of the smaller breeds, thrive well on the pasture lands, while on the cultivable land, which includes less than one acre in seven, are grown barley, potatoes and the oats which are so inevitable in Scotland. A.MCC.

HE'BRON, in the hilly country of Judah, about nineteen miles southwest of Jerusalem, is one of the oldest towns in the world which is still inhabited. It existed as early as the days of Abraham, for his wife, Sarah, died there and he purchased the cave of Machpelah from the Hittites for her sepulcher. In the present town, which is called EL-KHALIL, stands a great mosque named El-Haram. Within the walls of this mosque is a cave, supposed to be the ancient sepulcher, in which not only Sarah, but also Abraham, Isaac, Jacob and Rebecca were buried. It was in Hebron that David was

ed king of Israel, and he reigned there ven years. The present town, located eet above sea level, has a population of 20,000, most of them Mussulmans. Since t has been under Mohammedan rule.

ATE, *hek'a tee,* a goddess in Greek logy, frequently represented as having heads, or three bodies, with serpents l her neck and shoulders. She had the to bestow or withhold at pleasure the g of wealth, y, wisdom od luck to ls, and was ly goddess retained under the f Zeus. She bsequently nded with l other di- s, such as Diana and pina, and t became a ic goddess, g all the s of Nature. cians and es claimed their infernal goddess. Offerings of dogs, and eggs were made to her at places three roads met.

THE TRIPLE-HEADED HECATE
From a statue in Rome.

TOGRAPH, *hek'to graf,* a pad composed atin and glycerine, and used for making impressions of writing or drawing. This made in the proportions of one ounce of to six and one-half ounces of glycerine. two ingredients should be allowed to mix ating slowly for a number of hours over el filled with hot salt water. When thor- melted the mixture is poured into a shallow pan and allowed to harden, when l present an even, smooth surface. A l copying ink is needed, which can be pur- l at a stationery store. The matter to be l is written and placed face downward on d; after a short period the imprint of the g will be transferred to the pad. About pies may be made by placing blank paper the tracings on the pad and gently rub- o effect a transfer of the impression. The s little, if made at home, for it includes r that of the pan, glycerine, gelatin and g ink. School-supply houses sell hecto- s for about $1.50.

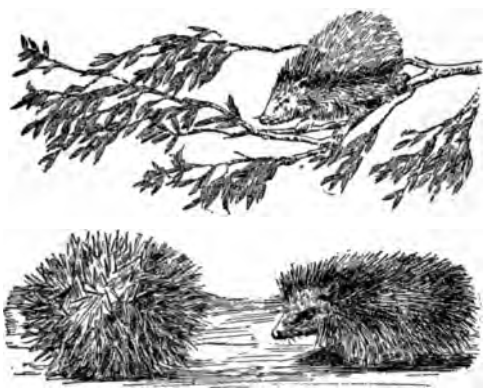
HECTOR, *hek'ter,* the most attractive character in the *Iliad;* in Greek mythology the most valiant of the Trojans, whose forces he commanded. He engaged the Grecian heroes in conflicts and often gained advantage over them. By his presence Troy was unconquerable, but when he killed Patroclus, the friend of Achilles, the latter slew him and dragged his body about the walls of the city at his chariot wheels. Priam, the father of Hector, afterward got possession of the body and gave it solemn burial. In the sixth book of the *Iliad,* Hector's leave-taking of his wife, Andromache, and his departure to meet Achilles for the last time, are the finest episodes described therein. Mrs. Browning has a charming poem about a "Hector in flowers" which she planted in her garden. See ILIAD; TROY; ANDROMACHE.

Write on your doors the saying wise and old,
"Be bold! be bold!" and everywhere—"Be bold!
Be not too bold!" Yet better the excess
Than the defect; better the more than less;
Better like Hector in the field to die,
Than like a perfumed Paris turn and fly.
LONGFELLOW: *Morituri Salutamus.*

HECUBA, *hek'u ba,* in Greek mythology, the second wife of Priam, king of Troy, and, according to Homer, mother of nineteen of Priam's fifty sons. In the overthrow of Troy Priam was slain, and Hecuba was given as a slave to Odysseus. According to one form of the legend, Hecuba, in despair, leaped into the Hellespont.

HEDGEHOG, *hej'hog,* a member of the timid rodent family, somewhat similar in appearance, but not in habits, to the American porcupine. The hedgehog is a native of Europe and Western Asia, but no true species is found

in America. It is about nine inches long; the stiff hair on its back is extended into short spines, and on the underside of its body there is short fur. It has a long nose, which it uses in rooting for insects, such as ants. When alarmed, it curls itself up, with its head underneath, and looks like a ball covered with brown spikes. The longer the enemy's attack continues the tighter the ball becomes. The hedgehog feeds at night on insects, bird's eggs and small snakes, and in winter hibernates completely (see HIBERNATION). The mother hedgehog bears from four to eight young at a time. The porcupine is often confused with the hedgehog. The former, however, feeds on twigs and undecayed animal matter, and relies entirely on its quills for defense. See PORCUPINE.



THE HEDGEHOG

HEDIN, *heh deen'*, SVEN ANDERS (1865-), a Swedish explorer, famed for his researches and observations in parts of Asia which had not been previously studied in detail by geographers. His early expeditions took him into East Turkestan, the Pamir, Northern Tibet, Mongolia and Siberia, and the results of his studies were published in 1899 in a volume entitled *Through Asia*. Of still greater import was a journey to Tibet in 1906-1908, for on this expedition he collected data that made possible the first detail map of that portion of the Asiatic continent. Hedin received many honors, including election to the Paris Academy of Sciences in 1911 and enrollment in the Swedish nobility in 1912. Late in 1914 he was asked by Emperor William II to visit Belgium for the purpose of studying the effects of the German invasion of that country.

SVEN ANDERS HEDIN

HEGEL, *ha'gel*, GEORG WILHELM FRIEDRICH (1770-1831), a German student of mental phenomena, the last of four great writers (the others being Kant, Fichte and Schelling) who during their age developed the idealistic philosophy of Germany. At one time so great was Hegel's influence that he was said to have been the philosophical dictator of Germany. He was a native of Stuttgart, and was educated at the University of Tübingen. For many years he taught at the universities of Jena and Heidelberg, and later accepted the professorship of philosophy at the University of Berlin.

Hegel maintained that the world of objects is not only related to an intelligence, but that it can be nothing but the revelation or manifestation of intelligence. He connected his idealistic or spiritual view of things with the modern idea of evolution or development (see EVOLUTION). His philosophy divides itself into three departments—*logic,* or the science of thought in its pure unity with itself; the *philosophy of nature,* in which the ideal principle, supposed to exist in all things, is shown to underlie even the external things of the material world; and the *philosophy of spirit,* which concerns the life of man as a self-conscious being in his relation to a material world. His most important books are *Logic, The History of Philosophy, The Philosophy of Religion* and *The Philosophy of Art.* The ideas of Hegel still retain their power and form one of the most important elements in modern culture. See METAPHYSICS.

HEGIRA, *hej'ira*, a word derived from the Arabic, meaning *going away,* commonly applied to the flight of Mohammed from Mecca to Medina, Friday, July 16, 622. Mohammed had to face danger and much opposition in trying to persuade his countrymen to give up the idolatry that was carried on in Mecca, and he was forced to flee for his life to Medina, in Arabia, which was thereafter known as "the prophet's city." The followers of Mohammed, all over the world, date their years from his flight, as Christians date their calendar from Christ's birth. The word is often spelled HEJIRA.

The Caliph Omar instituted the new Moslem calendar in 639 or 640, to begin with the first day of the first month in which the flight took

See CALENDAR; MOHAMMED; MECCA;
A.

DELBERG, *hi'del berK,* an ancient city
rmany, about fifty-five miles south of
ort, appeals to the mind because of its
sive achievements in learning; to the
because of its tragic history; and to the
because of the charm of its natural
. The city stands on a narrow strip
n the River Neckar and the rock of
berg Castle, and consists primarily of
ng, narrow street.

lelberg's most famous building is its cas-
a hill 300 feet above the town. Though
ruin, its size and magnificence, its situa-
id its interesting history place it among
st famous of the old castles in Europe.
at the end of the thirteenth century, it
s some elaborate examples of early and
enaissance architecture. It contains an
arian museum and the celebrated Tun,
e of holding 50,000 gallons of wine.
; the city's churches are the Church of
oly Ghost, of which the nave is for
tant and the choir for Roman Catholic
p; and the Church of Saint Peter's,
Jerome of Prague, in 1460, expounded
eformed doctrines. The trade is chiefly
ks, tobacco, beer and wine.

elberg University, the oldest in Ger-
was founded in 1386. It comprises facul-
theology, law, medicine, and philosophy,
s about 100 professors and lecturers. Its
ts numbered about 1,500 before the War
Nations; of these many were Americans.
of Germany's most famous scholars have
rofessors here. Its library consists of
50,000 volumes and 4,700 manuscripts.
berg was originally modeled after the
sity of Paris, and at first was a Catholic
tion. After the Reformation it became
onghold of Protestant learning. In 1802
reorganized on a larger scale and since
come one of the world-famous universi-
The smart, peaked hats and broad corps
s of the students add to the scenic fea-
f the neighborhood, and the jovial stu-
fe is unique. The following is the begin-
f its famous college song:

Old Heidelberg, thou fair one,
Thou City rich in lore;
The Neckar nor the Rhine vale
Have cities honored more.
Belov'd by gleeful comrades
With Wisdom filled and Wine;
Thy river's glist'ning waters
Shine forth like radiant eyes.

HEILPRIN, *hyle'prin,* ANGELO (1853-1907), a naturalist and traveler, and one of America's leading authorities on the subjects of geography and geology. Professor Heilprin was born in Hungary, but emigrated to America with his parents when three years of age. He completed his education in Europe, studying in London, Geneva and Vienna. He led the Peary relief expedition to Greenland in 1892, and after the eruption of Mount Pelee in 1902 made two journeys to the island of Martinique and climbed to the crater many times while the volcano was in eruption. Among his best-known works are *The Geographical and Geological Distribution of Animals, The Earth and Its Story* and *Alaska and the Klondike.* One of the greatest services he rendered was in connection with the editorship of Lippincott's *Geographical Gazetteer.*

HEIMDALL, *haym'dahl,* in Norse mythology, the guardian of the bridge of the gods against the attacks of the giants. According to the popular legend of the Northland, he could see as well by night as by day, could hear the grass grow and required very little sleep.

HEINE, *hi'ne,* HEINRICH (1799-1856), the keenest satirist in German literature after Goethe and the most gifted and graceful poet of his century. He was the very embodiment of the restless, discontented age; one of the most important influences in modern German letters, and an example of a splendid genius not backed by strength of character. He was born at Düsseldorf and studied law at Bonn and Berlin. In order to practice his profession, he was compelled to renounce his Jewish faith. His revolutionary tendencies, and especially his open hero-worship of Napoleon, made him so unpopular in Germany that he was obliged to remove to Paris, where he was well received and where he remained until his death.

Nearly all his writings are either lyrical, autobiographical, journalistic or controversial. His *Book of Songs* contains some of the choicest gems of lyric poetry, many of which were set to music by Schumann and Mendelssohn. A vacation trip through the Harz Mountains was the inspiration of his famous *Harz Journey,* the first of his series of *Travel Pictures.* These are made up of biographical comments, satires and religious and political discussions. During his last years, when helpless with paralysis, he continued to work; no bodily suffering could break his creative power, and he wrote and jested to the last. During these years of pain he published his *New Songs,* a satirical political poem

entitled *Germany*, and three volumes of *Miscellaneous Writings*.

HEIR, *air*, a term derived from the Latin word *heres*, meaning *one entitled to inherit*, refers in law to a person entitled to lands, tenements or other real property of a deceased person. An *heir presumptive* is one who would inherit if his ancestor were to die at that particular time, but whose right of inheritance might later be defeated by some nearer heir afterwards born. An *heir apparent* is one whose right of inheritance is certain, provided he outlives his ancestor as the eldest son. *Heirlooms* are such personal belongings as go to the heir along with the inheritance and not to the executor of the deceased. See REAL ESTATE; PERSONAL PROPERTY.

HEKLA or **HECLA**, *hek'la*, a volcanic mountain in Iceland, rising 5,102 feet, about twenty miles from the coast. It is composed of basalt, lava, ashes and other loose volcanic matter, has five craters and is perpetually snow-clad. Since the tenth century it has been in eruption forty-three times, the most terrific disturbance occurring in 1783, when the stream of lava discharged was forty-five miles long and fifteen miles wide. In 1845 it again became active and continued for fifteen months to erupt from three craters. The latest outburst occurred in 1878.

HEL, or **HELA**, *hel'a*, in Norse mythology, the goddess of the region of the dead. She was the daughter of Loki and the giantess Angurboda, and her dwelling was under a root of the sacred ash tree Yggdrasil. In the Middle Ages she was confused with the kingdom over which she ruled, but in later mythology is represented as being half blue-black and half flesh color, and of extremely repulsive appearance. Her kingdom was peopled only by those who died of disease and old age.

HELENA, *hel'e na*, ARK., the county seat of Phillips County, in the east central part of the state, sixty-five miles southwest of Memphis and 110 miles southeast of Little Rock, the state capital. It is on the Mississippi River and on the Missouri & North Arkansas, the Saint Louis, Iron Mountain & Southern and the Yazoo & Mississippi Valley railroads. Boats ply between Helena, Saint Louis and New Orleans and other river towns. In 1910 the population was 8,772; in 1916 it was 10,796, by a Federal estimate.

Helena occupies a site one mile square on built-in land along the river and is protected by levees. It has a Federal building, county courthouse, erected in 1915 at a cost of $250,000, a fine high school, a public library, several monuments to heroes of the War of Secession, and is the seat of a United States district court. The shipping of lumber, cotton and cottonseed oil is the chief industry. The city has lumber and woodworking factories, stave mills, box factories, manufactories of chairs, brooms, spokes and handles, cotton compresses and cottonseed oil mills. M.W.M.

HELENA, MONT., the state capital and the county seat of Lewis and Clark County, is situated in the west central part of the state, in one of the richest mineral sections of the country. It is seventy-two miles northeast of Butte, ninety-eight miles southwest of Great Falls and eighteen miles west of the Missouri River, and is on the Great Northern and the Northern Pacific railroads. The population, which in 1910 was 12,515, was 13,612, by Federal estimate, in 1916. The area of the city is nine square miles.

Helena lies at an altitude of 4,200 feet and is surrounded by ranges of the Rocky Mountains. The source of much of its wealth is the rich gold, silver, lead and zinc mines, whose total production has amounted to nearly $350,000,000. The Last Chance Gulch, the name of the mining camp from which the city has grown and from which $35,000,000 in gold was obtained by placer mining, is now the main street of the city. The surrounding country is not only rich in mineral wealth but is also an important agricultural and stock-raising section, and is noted for its picturesque scenery. Prickly Pear Valley, lying just north of the city, contains 100,000 acres and is one of the best agricultural portions of Montana. On the Missouri River are located the great dams which furnish power to various sections of the state for use in mines, city lighting, manufacturing and irrigating purposes. Industrial enterprises of the city include railway shops, smelters, quartz crushers and a number of factories.

The state Capitol, Federal building, courthouse, cathedral, Y. M. C. A. building, Masonic Temple and a library are prominent buildings. Helena contains the Montana Wesleyan University, Mount Saint Charles Catholic College, Saint Vincent's Academy, the state library, state law library and an assay office.

The Last Chance Gulch was staked out in 1864. The settlement which followed was incorporated as a town in 1881. Since 1889 Helena has been the state capital. The commission form of government was adopted by the city in 1915. L.M.R.

HELEN OF TROY, the fairest woman of the ancient world, whose name to every age since her own time has stood for all that is most beautiful. It was of her the poet Marlowe wrote:

Was this the face that launch'd a thousand ships
And burnt the topless towers of Ilium?

According to popular myth, she was the daughter of great Jupiter and Leda, whom the king of all the gods had courted in the semblance of a swan. When but a child she was so beautiful that Theseus bore her off to be his bride, but she was brought back to her Spartan home, and as she grew she increased in beauty so that thirty ardent suitors sought her hand. Proclaiming Menelaus, king of Sparta, as her choice, she bound the other suitors by an oath that they would help her husband in his need. When Paris, son of Priam, king of Troy, became a guest in Menelaus' home, he pleaded with Helen that she go with him back to his father's house, and he won his suit. Some of the legends declare she went willingly, while others assume that Paris carried her to Troy by force. Forsaken Menelaus called on all those Grecian chiefs whose sacred oath he held, and they came forward to avenge his wrong. This was the cause of the great Trojan War, the most terrific conflict of old times.

THE ABDUCTION OF HELEN

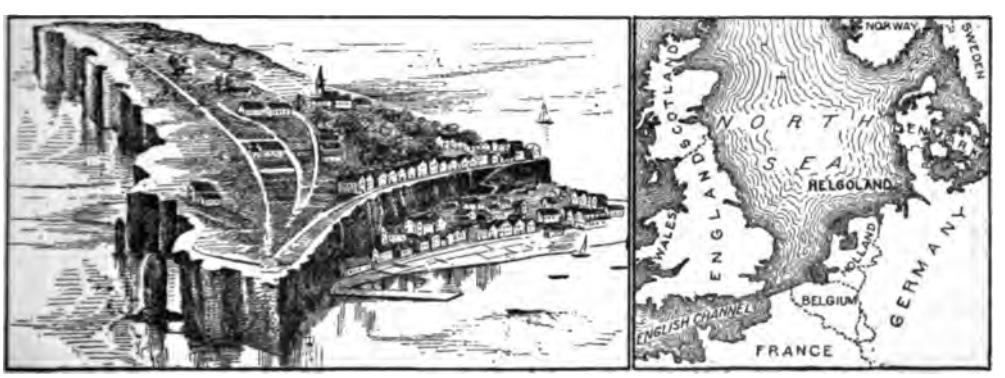
"Then from her husband's stranger-sheltering home,
He tempted Helen o'er the ocean's foam."

When Troy had fallen, and false Paris, too, the lovely cause of all the loss of life, whose beauty still could drive men to despair, returned to Menelaus, whom she found ready to take her once more as his wife. Their later life in Sparta, their old home, passed happily for them, but all her days were saddened by the thoughts of all the woe which Greece had suffered for her beauty's sake. In poetry her name is often found, and Tennyson, in *A Dream of Fair Women,* described her in these words, which make her beauty and her sadness felt:

At length I saw a lady within call,
Stiller than chisell'd marble, standing there;
A daughter of the gods, divinely tall,
And most divinely fair.

Her loveliness with shame and with surprise
Froze my swift speech; she, turning on my face
The starlike sorrows of immortal eyes,
Spoke slowly in her place. A.MC C.

HELGOLAND, *hel'go lahnt,* a tiny but most important island in the North Sea, belonging to Germany, and covering an area of only one-fifth of a square mile. It is thirty-five miles



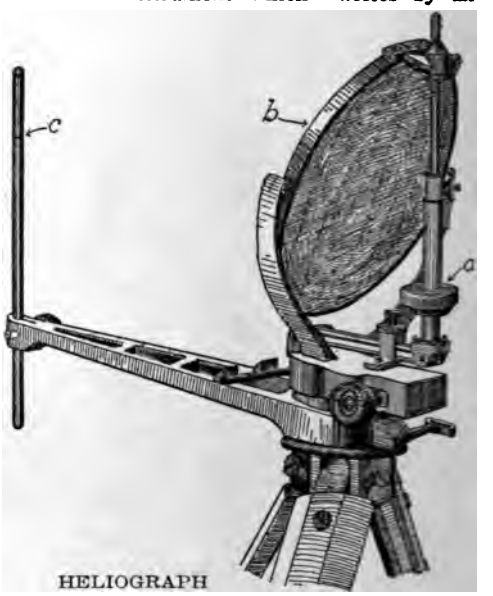
THE ISLAND OF HELGOLAND

from the mouth of the River Elbe and from the entrance to the Kiel Canal. Until recently a summer resort and the home of peaceful fishermen, the island in 1914, and afterwards, possibly played a more important part in the War of the Nations than the most fiercely contested trenches in France and Belgium. The inhabitants were removed to the mainland at the beginning of the war, and the island became a naval base. It now bristles with powerful guns under the protection of which the German fleet may lie in safety, for no hostile vessels can approach within twenty miles of this impregnable fortress.

The interior of the island is a plateau called the *Oberland,* 200 feet above the sea. At its southeastern end is a sandy stretch of shore called the *Unterland,* with an excellent harbor. An elevator and a stairway with 192 steps lead from the shore to the Oberland. On the plateau is a powerful wireless station, and a cable connects the fortress with the mainland. The island was ceded to Germany in 1890 by Great Britain in exchange for Zanzibar, on the east coast of Africa, a trade which Britain later had cause to regret.

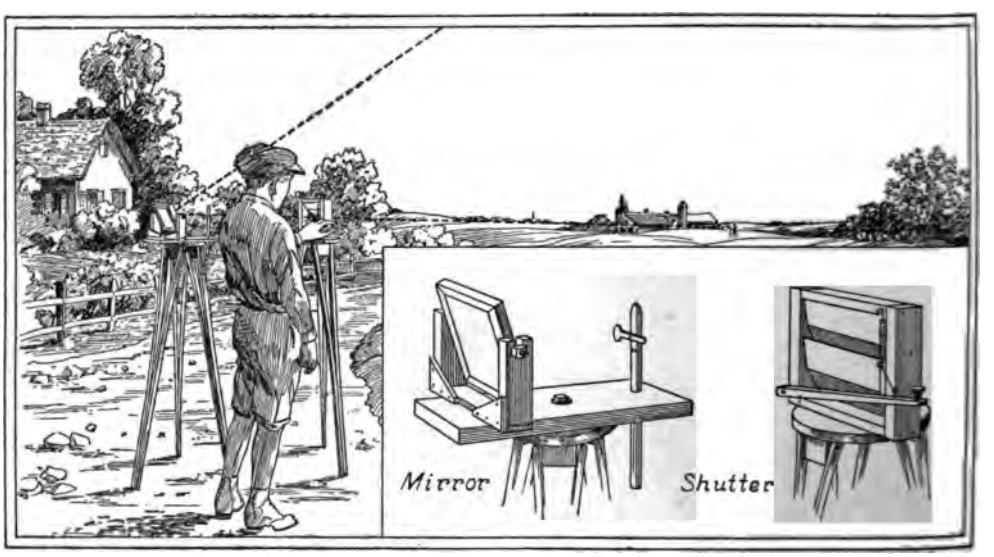
HELICON, *hel'i kon,* a mountain range in Bœotia, in Greece, celebrated in ancient days as the seat of the Muses. The highest summit, Mount Helicon, is 5,000 feet high. Two fabled fountains were here; Hippocrene, one of them, is said to have gushed forth when Pegasus, the winged horse, rushed by. A grove and temple adorned with statues stood on the eastern slope, and were sacred to the Muses, or the nine daughters of Zeus. Hesiod, the poet and wandering singer, lived in the village of Ascra, now called *Pyrgaki,* at the foot of Mount Helicon. See MUSES.

HELIOGRAPH, *he'li o graf,* a word derived from the Greek *helios,* meaning *the sun,* and *graphein,* meaning *to write.* It therefore describes an instrument which "writes by the



HELIOGRAPH

sun," or signals to distant places by means of sun flashes reflected by a mirror. The distance to which messages may be sent depends on the



HOW A BOY MAY USE THE HELIOGRAPH

s of the atmosphere and the size of the ıed. Under favorable conditions, mes- ıve been flashed more than 200 miles. t possesses great advantages, is easily and quickly made ready for use, the ph has the disadvantage of depending on the sun, since it cannot be used in weather.

nstrument consists of a mirror glazed icksilver, the mirror-back being covered ne opaque material (see *b* in illustra- , signaling key, called the *collar* (*a*), l similarly to an ordinary telegraph key, ghting vane (*c*). The whole instrument ıted on a tripod. Its chief use is in operations when neither telegraph nor ıe is available. The mirror is so ad- s to produce a flash from the sunlight guide it in the required direction, which tained by the sighting vane. The elegraph code is used, letters being in- by long and short flashes produced by and releasing the operating key.

OPOLIS, *he le op' o lis,* from the Greek *polis,* meaning *city of the sun,* was, in days, a city in Lower Egypt, situated east side of a branch of the Nile, near t of the Delta. Its site is now occupied village of *Matariah.* The obelisks of n I were erected here, as were those ıown as Cleopatra's Needles, one of in New York and another in London. lis was noted as a religious and educa- enter; its priests were credited with be- t scholars, and Plato, Thales and Solon l to have studied under them. The the once flourishing town were fairly eserved for a long period, but at the time little remains except one of the of Usertesen I.

OS, *he' le ohs,* in Greek legend, the , child of the Titan Hyperion and the Theia, and brother of Aurora. He was ntified with Apollo. According to the e dwelt in a magnificent palace in the ıich he left in the morning to pursue -giving labors and to which he was con- t night in a winged boat of gold. He dely worshiped, and had temples in , Argos, Elis and elsewhere, with head- at Rhodes. In art he was represented autiful youth with hair unbound and by rays. See APOLLO.

OTROPE, *he' li o trohp,* a delicate, old- d plant which bears deliciously-fragrant s. It is a plant which requires plenty of warmth and sunshine, and the flowers are supposed to turn always toward the sun. The name was therefore derived from the Greek words, *helios,* meaning *the sun,* and *tropes,* a *turning.* A number of wild species are found in the warmer parts of the world, and one species grows along sandy shores of Eastern United States.

HELIOTROPE

O sweetest of all the flowerets
That bloom where angels tread!
STEDMAN: *Heliotrope.*

The heliotrope of greenhouses and gardens, however, is a native of Peru. It is most easily raised from cuttings and grows from one to two feet high, a shrubby, much-branched plant. The veined, wrinkled leaves are ovally lance-shaped. The sweet, tiny flowers are salver-shaped, and grow in thick clusters. Their color is bluish-purple or pinkish-lilac, and anything having that particular hue is called heliotrope. Perfumes and sachet powders are made from these flowers.

HELIOTROPE, or **BLOODSTONE,** a subspecies of quartz, of a deep-green color, usually variegated with blood-red or yellowish spots of jasper. It is hard and translucent, and belongs to the group of semiprecious stones. According to Pliny, the ancient historian, it derived its name from the belief that if the stone were thrown into water it changed the sunlight falling upon it into a bloodlike reflection. Heliotrope is found principally in Tartary, Persia, Siberia and in the island of Rum, Scotland. Many fine Greek and Roman antiques set with bloodstones are preserved in famous gem collections.

HELL, a place designated in the Scriptures for the wicked after death, where they are banished from the sight of the Lord. In the early English translations of the Bible, the word, meaning *a hidden or unseen place,* is used for the Hebrew *sheol,* the Greek *hades* and the Greek *gehenna* (which see). Ancient Greeks and Hebrews, as well as the Teutons, thought that sheol or hades was a place under the earth whither all people, good or bad, went after death, so in the Revised Version of the New Testament hell is used only to translate Ge-

henna. Christian sects differ greatly in their opinions as to the length and kind of punishment inflicted in hell.

HELLEBORE, *hel'e bohr,* a group of poisonous plants belonging to the buttercup family, represented in the United States and Canada by only two of the dozen known species. *Black* hellebore, so-called because of its black rootstock, is the source of a powerful poison, which, because of its purgative and emetic qualities, is sometimes used sparingly in medicine. In England it is known as the *Christmas rose,* for its bold white flowers appear in winter. A species known to the ancient Greeks, called Oriental hellebore, was supposed by them to be a remedy for insanity. *White hellebore* is the name of a plant of the lily family. Its roots, dried and ground to powder, are used as an insecticide.

HELLESPONT, *hel'es pont,* the ancient name of the narrow channel which connects the Sea of Marmora with the Aegean Sea and now called the *Dardanelles.* It was named after Helle, daughter of the king of Bœotia, who fell from the back of the ram with the Golden Fleece during her flight from the wrath of Ino, and was drowned in the channel. In legend and poetry the Hellespont is famed as the channel across which Leander swam nightly to visit the priestess Hero, and in which he lost his life when the light in her tower failed to guide him. It is said that Lord Byron also swam the Hellespont, though he was lame and had not the loverlike reasons that prompted Leander. See DARDANELLES.

HELL GATE. The early Dutch settlers who came to New Amsterdam (New York) discovered in the East River, between Long Island and Manhattan Island, a channel so dangerous that they felt no name but Hell Gate would fit it. From each end a tide poured in, with resulting whirlpools, eddies and conflicting breakers. To multiply its dangers to navigation, under the surface at high tide, but projecting well above it at low water, were numerous jagged reefs, about which the angry waters whirled. Early navigators avoided the pass when they could, but as settlements grew, commerce grew also, and the use of this channel became more and more necessary. Even practiced navigators took their sailing vessels through it reluctantly, because one boat in every fifty that attempted to go through it was ripped open by the rocks or broken in the whirlpools.

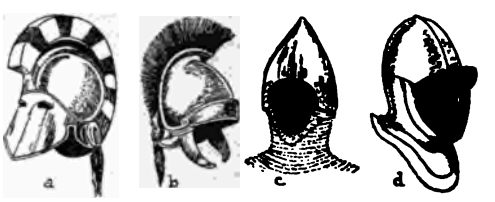
In 1851 the first attempts were made to make the channel less difficult and dangerous. Surface blasting was first resorted to, and the tops of several reefs were blown away; later, when the United States government took up the task, the reefs were undermined and destroyed by great charges of dynamite. The last of these operations, in 1885, left a channel 200 feet wide and twenty-six feet deep at low water, which permits the passage of large ocean-going vessels. Hell Gate is thus Hell Gate no longer, but the name remains as a reminder of its past.

HELL GATE BRIDGE

Opened for traffic January 1, 1917. It has not only the largest arch, but is the heaviest bridge in the world. The span is 1,016 feet long, and the top of the arch is 300 feet above the water. Over 500,000 cubic yards of concrete were used in its construction, of which 110,000 cubic feet are in the two towers. Its carrying capacity is thirty-eight tons for every linear foot. The bridge cost $25,000,000.

A notable bridge now spans the river at this point. It is one of the great engineering feats of the twentieth century in concrete construction.

HELMET, a defensive steel covering for the head, sometimes called a "war hat," which regained something of its former prestige, if not splendid appearance, in the War of the Nations in 1914, when a new steel helmet which would

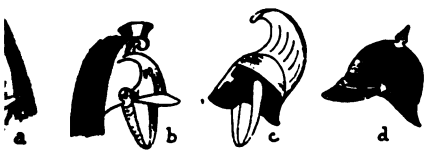


RELICS OF A BYGONE AGE

(*a*) Greek; (*b*) Roman; (*c*) fourteenth century; (*d*) seventeenth century.

stop a bullet was considered essential in the outfitting of soldiers. By means of this device thousands of infantrymen were saved from the hail of bullets fired by machine guns. Heretofore for centuries the steel helmet, as part of a soldier's protective covering, has been mainly considered from an historical viewpoint. In the Middle Ages, thin metal helmets were made in various styles and were provided with flaps and bars for protection. With the invention of the

all, however, these ancient devices were ed useless.



LATER HELMETS

Great Britain, 1805; (*b*) France, 1870; aly, 1870; (*d*) Germany, 1914.

LMHOLTZ, *helm'holts,* HERMANN VON 1894), a German scientist, distinguished y in physiology, mathematics and in ex- ental and mathematical physics. He and ipils gave to mathematical physics its anding position among the sciences. His ological works are chiefly concerned with e, the ear and the nervous system. He orn at Potsdam and educated at Berlin. 9 he became professor of physiology at sberg, and later acted in the same capac- Bonn and at Heidelberg. In 1871 he was ited professor of physics at Berlin, and h his efforts that city became the great- nter in the world during his time for the of physics through experiment. Among ny contributions to the sciences of which de such exhaustive study are *The Con- ion of Force, Manual of Optics, Popular es on Scientific Subjects* and the *Sensa- of Tone as a Physiological Basis for the y of Music.* Helmholtz was also greatly sted in music, in literature and philosophy.

LOISE, *a lo eez'.* See ABELARD, PIERRE.

LOTS, *hel'ots,* or *he'lots,* the third and class of society in ancient Sparta, com- of slaves who labored on the estates of igher classes. They were the property of ate, and not of the individual Spartans, g whom they were distributed by lot. Helots were treated very cruelly, for they o rights which their masters felt bound pect. They were watched with distrust nce, when they grew too numerous for fety of the state, 2,000 of the leaders were cred to decrease their apparently danger- mbers. In time of war they were obliged r arms for the state. In 464 B. C. they re- l against their masters, but after an eight- war were subdued. Thus they remained until after the Spartans were overthrown battle of Leuctra in 371 B. C., when they freed by Epaminondas.

LSINGFORS, *hel sing fors',* the capital and important port and commercial center of Finland, Russia. It is beautifully situated on the northern shore of the Gulf of Finland, 191 miles northwest of Petrograd, and has one of the best harbors on the Baltic Sea. A large trade in agricultural products is conducted with Petrograd, England and Sweden. The chief manufactures consist of sugar, tobacco, linen and carpets. As a naval station it ranks next in importance to Kronstadt, and its fortifications, from the standpoint of the world before the War of the Nations (1914), were regarded as impregnable. Helsingfors is the center of education and culture in Finland, and is a fine city with broad, regular and clean streets. Population in 1910, 147,218.

HELVETII, *hel ve'she i,* an ancient Celtic people who succeeded the early inhabitants of the Alpine region now known as Switzerland. The name means *hilly country.* According to Caesar they occupied the country between the Rhine on the east, the Jura Mountains on the west and the Rhone River on the south. While Caesar was governor of Gaul they tried to gain new territory, but were defeated and almost exterminated. Caesar then subjected the country to Roman domination and established several colonies. The Helvetii were mercilessly punished a second time for refusing to recognize and salute Vitellius as emperor after the death of Nero, and as a nation they soon after disappeared, being succeeded by the Alemanni, who, in turn, succumbed to the power of the Franks in A. D. 496.

HEMANS, *hem'anz,* FELICIA DOROTHEA (1793-1835), an English poet whose work made her beloved in England and America, was born in Liverpool. Many of her shorter poems, such as *The Treasures of the Deep, The Better Land, The Voice of Spring* and *The Homes of England,* have become standard English lyrics, upon which her reputation rests. Her first volume, *Juvenile Poems,* was published when she was fourteen years of age. Her principal works are *The Forest Sanctuary; Songs of the Affections; Hymns for Childhood; National Lyrics and Songs for Music,* and *Scenes and Hymns of Life.* For her play, *The Vespers of Palermo,* Sir Walter Scott wrote an epilogue, and this marked the beginning of a long friendship between them. Her poetry, though without great originality, is sweet, natural and pleasing; it was the outcome of a beautiful life spent in seclusion away from the world of big experiences.

HEMATITE, *hem'a tite,* the ore from which most of the world's iron and steel is obtained.

It is of a brownish-red, reddish or black color, but when scratched gives a blood-red streak, hence its name, which means *bloodlike*. Hematite occurs in almost all forms, from solid rock to loose earth. Some of the harder forms take a high polish and reflect light, like a mirror, therefore are called *specular iron*. An earthy variety constitutes the pigment, red ocher. But the great mass of hematite is valuable as the source of iron. In America this ore occurs in immeasurable quantities around the head of Lake Superior in Wisconsin and Minnesota, in Alabama and at Iron Mountain, Mo. See IRON, for details of wider distribution.

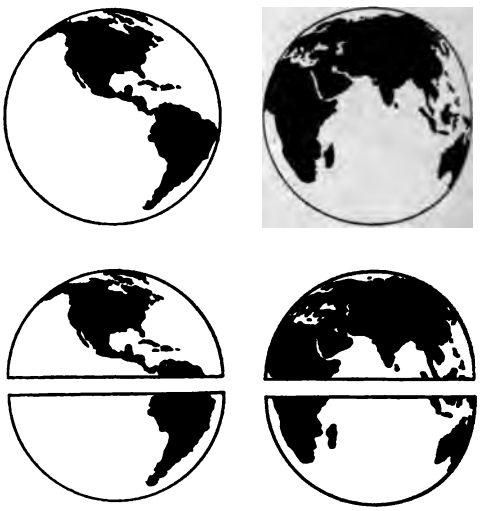
HEMIPTERA, *he mip'ter a,* a large group of insects popularly known as *bugs*. The word is derived from words meaning *half a wing,* and refers to the thick base and abruptly-thin tip in the most common species. The hemiptera differ from other orders of insects in two respects. First, the mouth-organ, called the *rostrum,* consists of a horny, jointed, tapering tube, which is adapted for piercing the tissues of plants or the skins of animals. By the aid of contractile muscles it sucks the juices from plants and the blood from animals. Second, the organs of flight, the fore wings, and the hinder parts, or wings proper, are thick and leathery at the base, and membranous at the tip. Certain forms, such as the bedbug and louse, have no wings; the water bugs may be entirely unwinged, half winged or fully winged. See ZOÖLOGY.

Consult Comstock's *Manual for the Study of Insects;* Foot's *Insect Wonderland;* Howard's *The Insect Book.*

Related Subjects. The following important members of the order Hemiptera are given separate treatment in these volumes:

Aphides	Louse
Bedbug	Mealy Bug
Chinch Bug	San José Scale
Cicada	Scale Insect
Jigger	Ticks

HEMISPHERE, *hem'i sfeer,* literally *half a sphere,* is a term particularly applied to one of the halves into which the globe is divided by geographers. The eastern hemisphere, or Old World, embraces Europe, Asia, Africa and Australia; north and South America are included in the western hemisphere, or New World. The boundary is not fixed by geographical or political considerations, but runs rather indefinitely from pole to pole through the North and South Atlantic and the Pacific oceans. The division of the earth's surface into northern and southern hemispheres is natural, the equator, in the exact center, forming the dividing line.



HEMISPHERES

Above, western and eastern, the New World and the Old World, respectively; below, northern and southern.

HEM'LOCK, a poisonous plant with leaves so like those of parsley that it is often mistaken for the latter plant. It grows to a height ranging from two to six feet, with hollow stems, many branches, and numerous clusters of small white flowers. The plant has a disagreeable, nauseous odor, which becomes very strong when the leaves or stems are bruised. This affords a sure and quick means of distinguishing between hemlock and parsley. The hemlock bears an egg-shaped fruit about one-eighth of an inch in length, which ripens in August or September. The leaves and fruit are used for medicinal purposes, chiefly on account of the soothing action of the drugs they contain. The poison hemlock is a native of Great Britain, Europe and some parts of Asia, and has been naturalized in North America and Chile. It grows chiefly on low-lying, marshy ground. Socrates, the Greek philosopher, and Phocion, the Athenian general, died after drinking a brew of poison hemlock.

HEMLOCK, or **HEMLOCK SPRUCE,** so called because of botanical resemblance to the hemlock plant (see preceding article). It is a large tree, growing to a height of seventy or more feet, and is found in the forests of Canada and the United States. There are four distinct species, but the most useful is the eastern hemlock, technically named ***Tsuga Canadensis,*** which is found in Eastern Canada and in the United States as far west as Minnesota and

hward to Georgia. The western hemlock, *'suga heterophylla,* is found on the Pacific t, and extends eastward to Montana and hward to Central California. The eastern ies supplies most of the hemlock lumber. nore than 2,400,000,000 feet cut in average s, only about 200,000,000 feet are of west- hemlock.

ie hemlock is a tree of great beauty, with l leaves, dark green above and silvery w. The wood is soft, and it warps con- ably when exposed to the air. It is used nsively for interior decorations, and the easing scarcity of white pine has created mand that is fast exhausting the forests. western supply has not yet been fully de- ped, chiefly because the western hemlock

WESTERN HEMLOCK
Branch and cone.

rs alongside of such desirable timber as glas fir, red cedar, larch and spruces. Hem- bark is extensively used in tanning leather, oil and pitch are distilled from the leaves wood. See TANNING; LUMBER.

EMP, a plant belonging to the nettle fam- whose fibers and seeds render it of great omic value to man. It is native to the ner parts of Asia, but is cultivated in ly all the countries of Europe and in rica. Russia, Italy and Austria-Hungary the largest producers of hemp on the pean continent, the annual output of fiber Russia in normal times being about 1,000,- 00 pounds. About 7,500,000 pounds are d each year in the United States, nearly f which comes from nine counties in the Grass region of Kentucky. It is also d to a limited extent in California and ana, and in a few other states.

scription of the Plant. The plant has a h, erect stem which varies in height from e or four to twenty feet, according to con- ns of soil and climate. Hemp cultivated fiber produces only a few small branches the top of the stalk. On these are borne large, dark-green leaves, which consist of serrated (finely-toothed) leaflets. The flowers that bear the pollen (staminate), and those that produce the seed (pistillate), grow on separate plants. The former are yellowish-green in color and grow in large clusters; the latter, which come to maturity later than the staminate flowers, are small and insignificant. See FLOWERS, subhead *Flower Structure.*

HEMP
Head of plant.

Growth and Harvesting. Like flax (which see), hemp requires a carefully-prepared seed bed, with deep plowing, followed by thorough harrowing. Its successful cultivation in the Kentucky Blue Grass region is due to the rich, loamy soil in that part of the state. In California it thrives best in the fertile soils of the low-lying lands along the rivers. The seed is sown broadcast, one to three bushels to the acre, and is only lightly covered. In Kentucky, planting begins usually in April, the first seeds ripening about 100 days later, when the crop is cut with a reaping knife or hemp-cutter. After it is cut, it is allowed to lie on the ground from four to eight days to dry.

Preparing the Fiber for the Market. Hemp fiber consists of many series of long cells in the inner bark of the stem, firmly knitted together. When cleared from the tissues that surround them, these form tough strands nearly as long as the entire stem. In order to free the fibers from the woody interior of the plant, the vegetable gums which surround them are dissolved by a kind of putrefaction which takes place when the stalks are soaked in soft water or exposed to the action of the weather. This process is known as *retting* or rotting. In Italy, where water-retting is the rule, the fibers are fine, lustrous, soft and creamy-white, the Italian product being the best in the world. Water-retting is more expensive than dew-retting, or exposure to the weather, and the latter process has been found to yield a greater profit to American hemp growers. Dew-retted hemp yields a fiber of grayish color.

In Kentucky the stalks after cutting are usually spread in long rows on the blue-grass

pasture land. When the retting process is completed the stalks are crushed and beaten with a heavy wooden hand break, by which the fiber is freed from the stem and roughly cleaned. A skilled laborer can break about 250 pounds of hemp a day. To break an average crop of fifty acres requires the services of ten workmen for two months, and the cost is about $500. In Kentucky, machines are now being used which break the stalks and clean the fiber much more rapidly than is possible by hand labor, but these have not as yet fully taken the place of the hand break. After the breaking process, the rough fiber is tied into bales weighing 150 pounds each and sold, the prices ranging from three and one-fourth to five cents a pound.

Uses of Hemp. Hemp fiber is exceedingly strong, a quality which adapts it admirably to the manufacture of ropes and cordage. Twines, carpet thread and yarns, sailcloth and coarse grades of woven goods, such as sheeting and toweling, are also made from it. Refuse fiber, called *oakum,* is often used to fill the seams of vessels. Hemp seeds contain from thirty to thirty-five per cent of oil, a substance used in cooking and as an ingredient of varnishes. Hemp seeds are also in common use as a food for birds.

The name hemp is also applied to various other fiber-producing plants, such as Manila hemp, sisal hemp, and bowstring hemp. See SISAL. B.M.W.

HEMP, INDIAN. See HASHISH.

HENDERSON, KY., an important tobacco market and the county seat of Henderson County, situated on the Ohio River in the northwestern section of the state. Evansville, Ind., is twelve miles north by rail, and Cairo, Ill., and Louisville, Ky., are respectively 100 miles southwest and 103 miles northeast, by water. The Louisville & Nashville, the Illinois Central and the Louisville, Henderson & Saint Louis lines provide railway transportation. Electric lines serve the city from all directions, and there is regular steamboat connection with Louisville, Evansville, Memphis and other river ports. Its population was 11,473 in 1910; it was 12,192 in 1914, by Federal estimate.

The city is twenty-one feet above the point reached by the highest floods, and consequently is locally known as *The Floodless City.* At this point the river is spanned by a steel bridge, built by George W. G. Ferris of Ferris Wheel fame. The territory surrounding the city is an agricultural and mineral region, rich in timber and coal deposits, and well adapted to the production of dark, heavy-fibered tobacco, cotton, fruit, wheat and Indian corn. Its industrial establishments include cotton and woolen mills, grain elevators, hominy mills, tobacco stemmeries, planing mills, box factories and coal mines. There are fifteen large tobacco houses. The city has a Federal building, erected at a cost of $100,000, a Carnegie Library and a well-equipped sanitarium. Atkinson Park, covering 130 acres, is one of the chief attractions of the city.

Henderson is one of the oldest cities on the Ohio River. It was known as Red Banks in 1790; in 1797 the name was changed to Henderson, in honor of Richard Henderson, a statesman and lawyer, who laid out the town. The place was incorporated in 1810, and the city charter was granted in 1854. In 1905 the boundary lines were extended to include Edgewood and Audubon. E.B.

HENDRICKS, *hen'drix,* THOMAS ANDREWS (1819-1885), one of the most famous of the governors of Indiana and a former Vice-President of the United States. He was born on a farm near Zanesville, Ohio; was educated in the public schools of Indiana, studied law in his uncle's office, and was admitted to the bar in 1843. He was elected to the legislature in 1848; to the national House of Representatives in 1851, and in 1863 to the United States Senate; was a candidate for the Democratic nomination for President in 1868, and in 1872 was elected governor of Indiana. He was nominated for the Vice-Presidency by the Democratic party in 1876; was again a candidate in 1884, with Cleveland as the candidate for President, and was elected. Mr. Hendricks was the fifth Vice-President who died during his term of office, his death occurring November 25, 1885, at Indianapolis.

HEN HAWK. See HAWK.

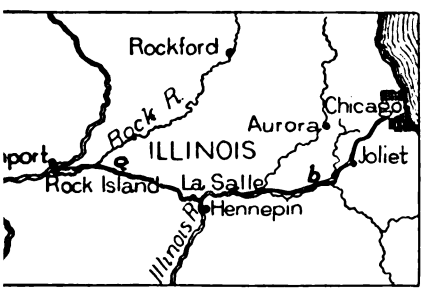
HENNEPIN, *hen'e pin,* LOUIS (about 1642-1706), a Belgian missionary, one of those explorers about whose names clings much of the romance of early days of adventure and discovery in the Mississippi Valley. He had preached and won many converts in France before he set out, in 1675, with La Salle to carry the gospel to the American Indians. As soon as he had made a slight acquaintance with their language he began preaching to the Indians at Fort Frontenac, but the call of further adventure was strong, and in 1678 he set out with La Salle on an exploring expedition. In a boat which Hennepin had built the party

its way through lakes Erie, Huron and gan, until they came to the Saint Joseph

Up this they paddled in canoes, which ore them down the Kankakee to the s River.

e they built Fort Crevecoeur, near the t city of Peoria, at which place Henne- rted from La Salle, to proceed down the s to the great "Father of Waters." Cap- by the Indians and carried far up the sippi, he and his followers were the first men to look upon Saint Anthony's Falls he Minnesota region thereabout. This ence discouraged Hennepin, who returned r afterward to France, and though his ors in the Church ordered him to return erica, he refused. After La Salle's death pin published a *New Discovery of a Very Region Situated in America,* in which umed the credit for many of La Salle's eries. Some of his assumptions were l false, but his story was enthusiastically nd widely translated.

NEPIN CANAL, or the ILLINOIS AND SSIPPI CANAL, the only small-boat canal ucted in the United States since 1850, s from the Illinois River near Henne- the Mississippi, three miles below Rock



ILLINOIS CANALS
Hennepin; (*b*) Illinois and Michigan.

After fifteen years' work it was com- in 1907 at a cost of $7,500,000 and is now rincipally for the transportation of coal he Illinois fields. The canal is seventy- iles long, fifty-two feet wide at the bot- nd seven feet deep, and has thirty-two

Another canal nearly thirty miles in , of the same width and depth, enters the pin near Sheffield and serves as a feeder, ter being forced into the main canal by a quarter of a mile long at Sterling. In tion with the Illinois and Michigan (which see), this affords a short route ht boats going from Lake Michigan to pper Mississippi.

HENRY, *hen'ri,* a name famous in English history, borne by eight sovereigns who have worn the crown of England.

Henry I (1068-1135), the third of the Norman line of kings, was the youngest son of William the Conqueror. Because of his studious habits he has received the surname *Beauclerc,* which means *good scholar.* He caused himself to be proclaimed king in 1100, on the death of his brother, William Rufus, who was killed while hunting in the New Forest. Henry's right to the throne was contested by his elder brother, Robert, Duke of Normandy, and in the wars which followed Henry not only established his claim to the royal title, but wrested from Robert all of his possessions in Normandy.

To win the favor of his Saxon subjects, he married Matilda, daughter of Malcolm III of Scotland; their daughter, the Princess Matilda, was named by her father as his successor to the throne. During Henry's reign great progress was made in the unifying of his Saxon and Norman subjects, and the wars he waged against the Normans in France greatly stimulated the feeling of English nationality. Like his illustrious father, Henry consistently opposed the powerful feudal lords, and made himself the champion of the common people.

Henry II (1133-1189), the son of Matilda, Henry I's daughter, and of Geoffrey Plantagenet, Count of Anjou, was the first of fourteen English rulers of the Plantagenet line. On the death of Henry I in 1135, the throne was seized by Stephen of Blois, a grandson of William the Conqueror, and after several years of warfare an agreement was made whereby Stephen was to retain the crown and Henry was to be his successor. The latter's coronation took place in 1154, and his long reign of thirty-five years was memorable.

Henry continued the policy of his predecessors in checking the power of the great nobles, and he also attempted to make the Church submit to the civil power. As a result of his struggle with the clergy, Thomas á Becket, the archbishop of Canterbury, was murdered. During his reign circuit courts were established, the financial system was reorganized and roads were built. In this period also the English gained their first supremacy over the Scotch, while the foundation for the present Greater Britain was laid by the king's conquest of Ireland. Henry's last years were embittered by the disloyalty and rebellion of his sons, among whom were Richard the Lion-heart and John, the next two sovereigns of England.

Henry III (1207-1272), eldest son of King John, succeeded his father in 1216, but his personal rule did not begin until 1227, when he was declared of age. He proved himself a faithless and tyrannical king, and in 1258 the great nobles, led by Earl Simon de Montfort, rose in revolt, forcing him to sign an agreement known as the Provision of Oxford, whereby the governing power was to be placed for the time being in the hands of a committee of the barons. Henry later repudiated this agreement, and in the civil war which followed he was defeated at the Battle of Leines (1264) and taken prisoner. In the king's name Earl Simon then summoned a Parliament, in which the commons, as well as the clergy and nobility, were represented, marking the beginning of the modern system of Parliamentary government (1265). Throughout the remainder of Henry's reign, his son, Prince Edward, had control of affairs.

Henry IV (1367-1413) was the eldest son of John of Gaunt (which see), and the first of the Lancastrian line of kings. He ascended the throne in 1399, on the abdication of the weak Richard II, and as he owed his right to rule to Parliament he is sometimes known as the first constitutional monarch of England. His firmness and vigor were revealed early in his reign, in his suppression of the uprisings of rebellious nobles and of the Scotch and the Welsh. During this period occurred the first persecution of the Lollards. Henry was the friend and patron of England's first great poet, Geoffrey Chaucer.

Henry V (1387-1422), son and successor of Henry IV, came to the throne in 1413. He continued his father's persecution of the Lollards, and in 1417 put to death their celebrated leader, Sir John Oldcastle. The Hundred Years' War with France, begun in the reign of Edward III, was renewed by Henry in 1415. After capturing the town of Harfleur, he met a great French army of armor-clad knights on the field of Agincourt, and with a force of 10,000, most of whom were armed with bows and arrows, overwhelmingly defeated them. Five years later he concluded with the French king, Charles VI, the Peace of Troyes, according to which the crown of France was to go to the English king on the death of Charles. War broke out again in 1422, and early in the campaign Henry was taken ill and died.

Henry VI (1421-1471) was proclaimed king of England in 1422, on the death of his father, Henry V, though at this time he was less than a year old. A few weeks later Charles VI of France died, and the child, in accordance with the terms of the Treaty of Troyes, was proclaimed king of France also. Henry's uncle, the Duke of Bedford, ruled for him in France and succeeded in holding that country until 1429, when, through the heroism of Joan of Arc (which see), the English were defeated at Orleans. Gradually the French won back their possessions, until, in 1451, Calais alone was left to England. That was not lost until a century later.

Henry was pious and gentle, but hopelessly incompetent, and at intervals suffered from attacks of insanity. The great nobles took advantage of his weakness to oppress the common people, and the popular discontent found expression in 1450 in the uprising known as Jack Cade's Rebellion. In this reign began the struggle between the rival houses of York and Lancaster (see ROSES, WARS OF THE), the first battle of which, fought at Saint Albans in 1455, was a defeat for the king's forces. In 1461, Edward IV, head of the House of York, was crowned king. Henry was reinstated for a brief period in 1470, but the following year he was imprisoned in the Tower of London, where he was murdered.

Henry VII (1456-1509), first of the royal Tudor line, was proclaimed king in 1485, after the defeat of Richard III at Bosworth's Field, the last battle of the Wars of the Roses. He laid claim to the kingly title as a descendant, on his mother's side, of John of Gaunt, founder of the House of Lancaster. His father was Edmund Tudor, Earl of Richmond. By his marriage to Elizabeth, a princess of the House of York, he at last united the two rival houses. Several insurrections troubled his reign, but these were easily suppressed, and he won the support of the common people by refusing to be drawn into foreign wars.

During his reign the royal power was greatly strengthened by despotic measures, but these were directed chiefly against the nobility, from whom he exacted heavy taxes. To strengthen an alliance made with Spain he arranged for the marriage of his son Arthur to Catherine, daughter of Ferdinand and Isabella, and, after Arthur's death, secured the betrothal of the young widow to his son Henry (afterward Henry VIII). The friendship of the Scotch was won by the union of his daughter Margaret with James IV of Scotland. Henry's reign was made glorious by the discovery of the continent of North America in 1497.

Henry VIII (1491-1547), the king who severed the ties that bound the Church of England to the Church of Rome, succeeded his father, Henry VII, in 1509, and was crowned two weeks after his marriage to Catharine of Aragon. During the first part of his reign he gave his attention chiefly to foreign affairs. After the election of Charles V as Holy Roman Emperor, Henry's aid was sought both by the emperor and by his rival for the imperial dignity, Francis I of France, and a friendly meeting took place in 1520 between the English and French kings on the famous Field of the Cloth of Gold. Henry gave his support to Charles, but withdrew from the struggle in 1525.

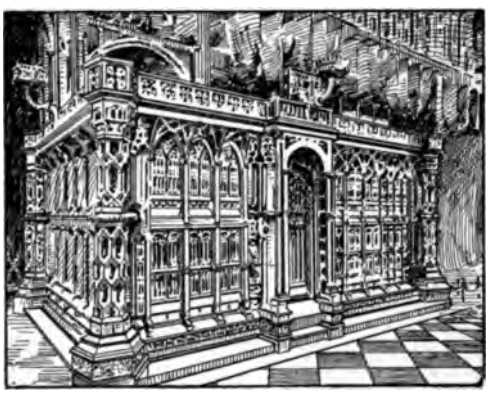
HENRY VIII

In the meantime he had come to a momentous decision in regard to his domestic affairs, and one that was destined to have permanent influence in English history. Having grown tired of his wife Catharine, who had failed to bear him a male heir, and infatuated by the charm and beauty of Anne Boleyn, one of the queen's maids of honor, he determined to secure a divorce. He pretended to believe that Heaven had failed to send him a son because he had married his brother's widow, and in 1527 he asked Pope Clement VII to declare the marriage illegal and to grant him a divorce. Not being able to obtain the Papal consent to this scheme, he acted on the suggestion of one of his trusted advisers, Thomas Cromwell, and proceeded to get a decree from his own courts. In 1533 he secretly married Anne Boleyn, and in the same year Thomas Cranmer, who had been made archbishop of Canterbury, formed a court and tried the case, as a result of which the first marriage was declared null and void, and the second one lawful.

A submissive Parliament completed the breach with Rome by passing two acts. One, enacted in 1534, set aside the authority of the Pope in England; the other, the celebrated Act of Supremacy (1535), declared Henry the supreme head of the Church of England. The king used his authority to suppress the monasteries of the kingdom, and in 1539 all monastic property was given to the Crown.

Anne Boleyn did not long retain the affection of her royal master, and in 1536 she was beheaded on the charge of unfaithfulness. Her daughter, the Princess Elizabeth, became in time Queen Elizabeth, or "Good Queen Bess," one of the most illustrious rulers of history. Jane Seymour, Henry's third wife, was the mother of a prince who later ruled as Edward VI. On the death of Jane, the king married a German princess, Anne of Cleves, the arrangements for this union being made by Cromwell. Henry's dislike for his wife resulted in another divorce and in the disgrace and death of the minister who had brought about the marriage. The fifth wife, Catharine Howard, was soon sent to the block, because it was proved that she had been guilty of misconduct before marriage. In 1543 Henry married his sixth and last wife, Catharine Parr, who succeeded in outliving her husband.

The outstanding feature of Henry's reign is the separation of the Church of England from



TOMB OF HENRY VIII

the Church of Rome, an event which sometimes overshadows his constructive work as a creator of the English navy. While other monarchs were creating standing armies, he was bringing the sailing warship to perfection, laying the foundation for England's mastery of the seas. The most important literary event of his reign was the publication of Sir Thomas More's *Utopia* (which see), a romance of an imaginary ideal kingdom. B.M.W.

Consult Adams's *History of England from the Norman Conquest to the Death of John;* Temperley's *Henry VII;* Hume's *The Wives of Henry VIII and the Parts They Played in History;* Hall's *Henry VIII.*

Related Subjects. The following articles in these volumes will throw light on the periods of English history covered by the reigns of these eight kings:

Agincourt
Becket, Thomas à
Boleyn, Anne
Cabot, John and Sebastian
Catharine of Aragon
Charles of France
Cromwell, Thomas
England, subtitle *History*
Field of the Cloth of Gold
Hundred Years' War
Joan of Arc
John
Lancaster, House of
Montfort, Simon de
Plantagenet
Reformation
Richard
Roses, Wars of the
Stephen
Tudor
William
York, House of

HENRY, the name of four French kings. HENRY I (1008-1060) was the grandson of Hugh Capet, founder of the Capetian dynasty. His reign marks the height of the feudal system in France.

Henry II (1519-1559), son and successor of Francis I, ascended the throne in 1547. During his reign the French won from the English the important port of Calais, their last possession in France, but in a war with Philip II of Spain the French king was less successful, and after suffering severe defeats was obliged to sign an unfavorable treaty at Cateau-Cambrésis (1559). His persecution of the Huguenots sowed the seeds of the terrible religious wars that desolated France during the reigns of his sons, Charles IX and Henry III. Henry's wife was the famous Catharine de Medici.

Henry III (1551-1589), third son of Henry II, succeeded his brother Charles in 1574. During his entire reign the country was harassed by the struggles between the Protestant and Catholic parties. By granting certain concessions to the Huguenots, Henry so alarmed the opposite faction that, under the leadership of the Duke of Guise, they formed a Catholic League. Through the influence of the League the privileges of the Huguenots were repealed, bringing on a war in which the Protestants, led by King Henry of Navarre, were successful.

Then followed the assassination of two Catholic leaders, the Duke of Guise and the Cardinal of Lorraine, which aroused the bitter indignation of all Catholics of France and prompted Henry to place himself under the protection of Navarre. The two kings then came to an understanding and planned the capture of Paris, but as they were advancing toward the city at the head of a great army Henry of France was assassinated. He was the last ruler of the House of Valois.

Henry IV (1553-1610), successor of Henry III, is best known as HENRY OF NAVARRE. He is one of the most imposing figures in French history for two centuries and one of the greatest of the Bourbon line of kings. He was the son of Anthony of Bourbon, Duke of Vendôme, and of Jeanne d' Albret, queen of Navarre. His mother brought him up in the Protestant faith, and in his early manhood he joined the Huguenot army in France. In 1572 he married Margaret of Valois, sister of Charles IX, and after the Massacre of Saint Bartholomew's Day, which took place during the marriage festivities, he was forced to accept the Catholic faith. Escaping from Paris, in 1576, he retracted his statement of conversion and placed himself at the head of the Huguenots, winning a decisive victory over the Catholic League at Coutras, in 1587.

Two years later King Henry III was assassinated. Before he died he named Henry of Navarre as his successor, but the latter had to assert his claim to the throne by force of arms. At Ivry, on March 14, 1590, he won the splendid victory which Macaulay has celebrated in his *Battle of Ivry*. Its opening lines are famous:

> Now glory to the Lord of Hosts, from whom all glories are!
> And glory to our Sovereign Liege, King Henry of Navarre.
> Now let there be the merry sound of music and the dance,
> Through thy cornfields' green and sunny vines, oh! pleasant land of France.

Even this victory did not smooth the way for him, and, in order to bring peace to his distracted country, he declared himself a Catholic and was crowned king in 1594. In 1598, when tranquillity had been restored throughout the kingdom, he issued the famous Edict of Nantes, granting religious liberty to his Protestant subjects. He then turned his attention to the development of his country's resources, and France enjoyed a period of prosperity not known for many years. In 1610, while he was preparing to make war on the House of Austria, he was struck down by the dagger of an assassin.

Consult Williams' *Henry II, His Times;* Freer's *Henry III, His Court and Times;* Burton's *The Fate of Henry of Navarre.*

Related Subjects. The following articles in these volumes contain much information as to the history of France during the periods of these kings:

Bourbon
Capetian Dynasty
Catharine de' Medici
France, subtitle *History*
Guise
Huguenots
Nantes, Edict of
Navarre
Valois

HENRY, the name borne by seven rulers who wore the crown of the Holy Roman

Emperor. Of these, Henry III, Henry IV and Henry VI were the most important.

Henry III (1017-1056) succeeded to the throne of Germany in 1039 on the death of his father, Conrad II, and was crowned emperor in 1046. Under his able rule the power of the German nation was greatly increased, and he is also renowned in history for the part he took in strengthening the powers of the Pope and in encouraging reforms in the Church. In 1046, when three rivals were attempting to gain the Papal throne, he made an expedition to Italy, settled the difficulty by appointing a new Pope, Clement II, and throughout the rest of his reign made the nominations for the holy office.

Henry IV (1050-1106), son and successor of Henry III, became king of Germany at the age of six. The nobles during his mother's regency rose in revolt, and when Henry, in 1069, took control of affairs, he found the kingdom in a state of turmoil. After several years of warfare, by which he attempted to establish his authority throughout his dominions, he came into conflict with Pope Gregory VII, who, in 1075, issued a decree forbidding civil rulers to make appointments to Church offices. Henry's answer to this decree was his summoning of a council at Worms in 1076, which deposed the Pope.

Gregory in turn excommunicated the king, releasing his subjects from their allegiance to him, and after a futile struggle Henry was forced to yield. Gregory had retired to a stronghold at Canossa, in the Apennines, and the humbled ruler was forced to stand barefooted in the snow, in the castle courtyard, for three days before he was permitted to kneel at the feet of the Pope and receive forgiveness.

On his return to Germany, however, he renewed the struggle, and for years his country was torn by civil war. In 1084 he succeeded in capturing Rome, placing on the Papal throne an antipope of his own selection, who in the same year crowned him Holy Roman Emperor. Soon after, Pope Gregory died in exile, and the contest was taken up by his successors, one of whom renewed the sentence of excommunication against the emperor. Finally, in 1105, after one of his own sons had been persuaded to rebel against him, Henry was forced to abdicate. A few months later, in the midst of preparations for war, he died.

Henry VI (1165-1197) was the son of Frederick, surnamed BARBAROSSA (which see). He succeeded to the throne in 1190, and the following year was crowned emperor at Rome. Through his wife he laid claim to the throne of Sicily, and a part of his reign was given up to the conquest of the Sicilian kingdom. While Richard the Lion-heart, king of England, was passing through Henry's dominions on his way home from the Third Crusade the emperor caused his arrest and imprisonment, and the release of the royal captive was secured only on the payment of a ransom equivalent to nearly $50,000—a large sum at that time. Henry was one of the strongest of the early German emperors, and when he died he was attempting to secure for his own family the hereditary rights to the crown.

Related Subjects. Further information as to the periods of history which fell within the reigns of these monarchs will be found in the following articles:

Clement	Gregory
Crusades	Holy Roman Empire
Frederick Barbarossa	Richard I
Germany, subtitle *History*	

HENRY, ALEXANDER (1739-1824), a Canadian fur trader, one of the pathfinders who opened the way to the Rocky Mountains. He is now best remembered for a book, *Travels and Adventures in Canada and the Indian Territory between the Years 1760 and 1776,* which was one of the sources used by Francis Parkman for his *Conspiracy of Pontiac.* Henry was with General Amherst during the Invasion of Canada by the British in 1760, but after peace was declared in 1763 went to Mackinac to become a trader. He was one of the few whose lives were spared when the garrison there was massacred at the time of Pontiac's conspiracy, but he was held a prisoner by the Ojibways for a year before he could make his escape. He then resumed his trading, in the course of which he made frequent journeys as far as the Rocky Mountains. In 1765 the commandant at Michilimackinac gave him an exclusive license to trade at that point. In the course of his travels he became convinced of the great extent of the copper deposits on Lake Superior, but his efforts to form a company for the development of mines were unsuccessful.

HENRY, JOSEPH (1799-1878), an authority in physics, whose brilliant experiments in electricity have coupled his name with Franklin's and Edison's as one of the three most original investigators that America has thus far produced in that branch of science. He was born at Albany, N. Y., and received his education in

the Albany Academy. He began to experiment with electricity at an early age, and his first important discovery was the electromagnet. A large magnet, which he built, capable of sustaining 3,600 pounds and occupying a single cubic foot of space, is now in the physical cabinet at Princeton University. In 1831 he invented the first electromagnet telegraph, transmitting signals over a wire more than a mile in length, causing a bell to ring at the farther end of the wire. "This," said President Garfield, "was the last step in the series of great discoveries which preceded the invention of the telegraph."

In November, 1832, he was called to occupy the chair of natural philosophy at Princeton, where he remained for several years. In 1846 he became the first secretary and director of the Smithsonian Institution. Upon the organization of the government lighthouse board in 1852 he became a member, and from 1871 until his death was its chairman. His published papers include over 150 titles. In 1886 two volumes of the *Scientific Writings of Joseph Henry* were published by the Smithsonian Institution. A *Memorial of Joseph Henry* was published by order of Congress in 1880.

HENRY, PATRICK (1736-1799), an American patriot, one of the greatest and most eloquent orators his country has produced. One great speech, urging action against England, delivered in 1775, stands as a model of rhetorical construction and is familiar to every schoolboy because of its oft-quoted climax, "Give me liberty or give me death!"

PATRICK HENRY

Born May 29, 1736, in Hanover County, Va., of Welsh and Scotch descent, he inherited from his mother remarkable conversational ability, but as a student he was a failure. He left school at an early age to enter the commercial world, but found himself ill-adapted for business life, and after repeated unsuccessful ventures he took up the study of law by himself. In 1760 Henry was given a license to practice upon promising to continue his study, for he was woefully lacking in legal knowledge. However, his brilliant speeches in a noted lawsuit, called the *Parson's Cause,* were stepping-stones to fame, and he suddenly found himself a power in the community.

An earnest advocate of the rights of the colonies guaranteed by their charters, when he became a member of the Virginia House of Burgesses (1765) he stood forth as the people's popular representative against the aristocratic faction. In May, 1774, he was elected a delegate to the First Continental Congress. A year later, while attending the Virginia Provincial Convention, in reply to the objections to his proposal to organize a militia for the defense of the colonies against England, he made his famous speech from which the following is taken:

> There is no retreat but in submission and slavery. Our chains are already forged. Their clanking may be heard on the plains of Boston. The next gale that sweeps from the north will bring the clash of resounding arms. Our brethren are already in the field. Why stand we here idle? What is it that gentlemen wish? What would they have? Is life so dear or peace so sweet as to be purchased at the price of chains and slavery? Forbid it, Almighty God! I know not what course others may take, but as for me, give me liberty or give me death!

In 1776 Henry was chosen a member of the committee to prepare the first constitution of the commonwealth of Virginia, and the same year was elected governor of that state, a post which he held for two terms, from 1776 to 1779 and from 1784 to 1786. Later, at different times he was offered a seat in the United States Senate, the position of Secretary of State (under President Washington), the office of Chief Justice of the United States Supreme Court, and reëlection as governor, each of which he refused. In 1799 he was elected to the Virginia House of Delegates, but died on June 6 of that year, before taking his seat.

Slovenly in appearance, uneducated, wholly unfitted for business and pitifully poor, Patrick Henry won his fame by sheer force of personality and oratorical power.

HENRY THE NAVIGATOR (1394-1460), fifth son of John I of Portugal and grandson of an Englishwoman, Phillipa of Gaunt. Prince Henry did much to encourage various explorers, and from time to time sent vessels on voyages of discovery, being influenced largely by what Marco Polo had told in his book. His great life ambition was to explore parts of the unknown world. One of the results of his efforts was the discovery of the shape of the great continent of Africa. Under his inspiration Portuguese sailors found their way

to Brazil, where, later, gold and diamond mines were developed which brought great wealth to Portugal, for that country thenceforth claimed the vast eastern section of South America (see DEMARCATION, LINE OF). The Madeira Islands were reached by him in 1420 and the Azores in 1448, and for the next fifty years the commerce and colonial possessions of the Portuguese were steadily developed in Brazil and India, due to the impulse he imparted. He also founded a school for navigation at Sagres, and built an observatory near Cape Saint Vincent.

HENSCHEL, *hen'shel,* GEORG (1850-), musical composer, singer and director, who established the famous London Symphony Concerts and was the first conductor of the Boston Symphony Orchestra. He made his first public appearance as a pianist when twelve years of age at Breslau, his native city, later studying at Leipzig and Berlin. His fine baritone voice soon gained him recognition, and he entered the field of grand opera. In 1877 he began a successful career in England as a teacher, singing also at leading concerts. In 1881 he married an American soprano, Miss Lillian Bailey. He composed several songs, operas, and orchestral pieces, of which the most important is the *Stabat Mater.* Both in England and in America Henschel has exerted a strong influence in musical circles.

HENTY, *hen'ti,* GEORGE ALFRED (1832-1902), an English author of scores of books for boys. These have no especial literary merit, but this fact does not disturb their juvenile readers. Something happens on every page; the heroes, many of them boys themselves, have to face tremendous obstacles, but they always come out successful; and in the background are stirring historical scenes. Libraries often find it difficult to supply the demand for "Henty books." As the stories are clean, as they exalt physical and moral courage, and always have a high moral tone, parents need not object to their great popularity.

Henty, who was born at Trumpington, in Cambridgeshire, was not always a writer of boys' books. After his graduation from Caius College, Cambridge, he served for a time in the army, and in 1866 became a war correspondent, reporting for a London paper the Austro-Italian and Franco-German wars, as well as expeditions to the interior of Africa. He was a man of middle age before he wrote his first juvenile story, but from that time the boys did not permit him to lay down his pen.

HEPATICA, *he pat'i ka,* a sturdy but dainty flower of the woodlands in nearly all countries of the northern hemisphere. The word comes from the Greek term for *liver,* suggested by the shape of the leaves. This flower is therefore often called *liverleaf,* or *liverwort.* There are two species, those with leaf lobes rounded, more common in Eastern America, and those with pointed leaf lobes, common in the West.

If the ill-smelling skunk cabbage be excepted, the hepatica is the first flower to appear in spring from Canada to Northern Florida. When snow is still on the ground hepaticas of white, pink, blue or lavender may be seen nodding in warm, sheltered places, each on a slender, hairy stem. The blossoms have six sepals, and are shaped like buttercups. They appear before the new green leaves rise above the leaves of last year, which are three-lobed, dark-colored and leathery.

HEPPLEWHITE, GEORGE. See FURNITURE, subhead *English Development.*

HEPTARCHY, *hep'tar ki,* from the Greek words, *hepta,* meaning *seven, arche,* or *kingdom,* was the name formerly given to the seven divisions of England established by the Angles and Saxons. These kingdoms were Kent, Sussex, Wessex, Essex, Northumberland, East Anglia and Mercia. They were founded at different times and were for years constantly at war with one another. In 827 Wessex, under Egbert, achieved supremacy and virtually absorbed the others, their consolidation marking the beginning of the modern Kingdom of England and the British Empire. Egbert is thus considered to have been the first king of England.

HE'RA. See JUNO.

HERALD, in the days when there were no newspapers, telegraph or telephone, a ruler made known his orders and his requests through officers known as *heralds.* In ancient Greece and Rome the heralds appeared in the public squares and summoned the assemblies or announced some exciting piece of news, such as the approach of a hostile army. In medieval times the duties of heralds multiplied, and their importance increased in comparison. Their costumes were gorgeous in the extreme, and their journeys from one court to another were attended with all sorts of elaborate ceremonials. As the direct representatives of the king, they were regarded as possessing in some measure the sacredness of royalty, and it was a crime to interfere in any way with a herald's performance of his duties.

HERALDRY. It is always interesting to read, in the old romances, of the coats of arms borne by the noble knights. One may not know what a "lion *passant* on a field *or*" really means, but it is nevertheless fascinating. It seems a subject far removed from science, and yet there is a science of coats of arms, or, as they are more technically called, *armorial bearings*. This science is *heraldry*, which in many countries is in charge of a special body of men. In England, for example, there is the Heralds' College, without whose authority no family may adopt a new coat of arms or assume one which their ancestors bore.

What Coats of Arms Mean. It used to be the chief pride of a warrior to keep his shield burnished like a mirror, for it was just a plain surface of metal with never a mark save those which had been made upon it by the spears of enemies. But when the Crusades began, in which knights from all over Europe took part, it was found confusing to have no distinguishing mark. The armor was all alike, the shields differed little from each other, and the visored helmet concealed the face. Gradually, therefore, there grew up the custom of emblazoning upon the shining surface of the shield some device by which the owner might be known. The choice of such a device was influenced by many considerations. Many knights chose the lion, a symbol of bravery, or the leopard, emblem of watchfulness and cunning; others the stag, with its proudly-held head; the eagle, the swan or the peacock. Plants, too, were made use of—perhaps some flower which grew about the ancestral manor, or some herb which was a favorite family remedy. That these coats of arms should become hereditary was to be expected, for naturally the second generation felt pride in the devices which their fathers had honorably worn.

All of this, however, was most informal, each man simply choosing what he pleased; and the result was that there were frequent duplications, and confusion was constant on the field of battle. Under the royal direction, therefore, officers called *heralds* were empowered to supervise all coats of arms, so no one's rights might be infringed upon. As customs and manners of dress changed, the coat of arms was no longer blazoned on the shield or embroidered on the outer coat, but it continued to have its place, and many an old family of England whose coat of arms has come down through the centuries is prouder of that than of its material possessions.

Some Interesting Examples. Heraldry is by no means a simple science. It demands an extensive knowledge and the ability to recognize the slightest shades of distinction. Here it is not possible to treat the subject fully, but some of the simpler terms, which are frequently met with in reading, may well be made clear.

First, there is the *escutcheon*, as it is called. This is the background for all armorial bearings, and is shield-shaped, to denote its origin. The term is frequently used figuratively, to signify the honor of the family, and a "blot on the escutcheon" refers to any disgrace incurred by a member.

The second point to be noted is the color of the field, or, as it is technically called, the *tincture*. There are two metals, gold and silver, known by their French names of *or* and *argent*, and there are five colors, red, blue, black, green, and purple, called respectively *gules, azure, sable, vert* and *purpure*.

The figure or device inscribed on an escutcheon is known as a *charge*, and charges are of infinite variety. Some are mere designs in straight lines, but the most interesting are conventionalized pictures of natural or fabulous animals. Most popular of all is the lion, which is shown in a number of positions. Since references to these are scattered casually through literature, it will be worth while to explain a few of the terms.

A lion *rampant* stands erect on his hind legs and claws the air with his fore feet. A lion *passant* is shown in walking position, looking straight ahead. *Couchant*, he is on the ground, with his head raised; *dormant*, he is asleep;

statant, he stands with all four feet firmly
e ground. This little discussion will make
the reference in the first paragraph to a
passant on a field *or*." This means sim-
lion in walking posture on a gold field.

tional Coats of Arms. If an individual
the need of a coat of arms to mark his
nt and his dignity, so much the more does
at country, and most of the nations of the
l make use of such devices. In monarch-
he national coat of arms is almost always
of the royal family, and those of some
tries show in their charges every change in
ine of descent. This has been true in Eng-
, where the arms of France, of the House
range and of the House of Hanover for-
y appeared, but to-day the British coat of
has been simplified so that it bears the
rds of England, the rampant lion of Scot-
and the harp of Ireland. Below the shield
ar the English rose, Irish shamrock and
h thistle, about it is the ribbon of the
er and above are the crown and a crowned

See GARTER, ORDER OF THE.

the United States there were no devices
h had been handed down through the cen-
s, and it was consequently necessary to de-
upon some appropriate symbol. On June
782, there was adopted the coat of arms,
s it is more commonly called, the *great*
which is in use to-day. It shows the Ameri-
eagle, bearing on its breast a shield with
een stripes and thirteen stars, holding in
eak a scroll with the words *E pluribus*
n and in its claws an olive branch and a
f of arrows. Canada has a Dominion coat
ms which shows the seals of the four orig-
provinces—Ontario, Quebec, Nova Scotia
New Brunswick—but this is not used as is
eal of the United States. Instead, there is
eat seal, bearing as its central figure the
g sovereign of Great Britain. Each prov-
and each state in the United States, has its
seal, and these are all shown in the articles
he provinces and states; also the coats of
of the various important countries appear
eir proper places. A.MC C.

nsult Whittemore's *Origin and Antiquity of*
ldry; Davies's *Armorial Families*.

ERAT, *he raht'*, capital of the province of
ame name in Afghanistan, a city of political
strategic importance, and long regarded as
'key to India." The reason for this is that
city is on the only fairly good wagon road
ugh the country (see AFGHANISTAN); it is
miles south of the Russian frontier and
370 miles west of Kabul. The town itself is unsightly, with crooked, narrow and dirty streets and few notable buildings. The chief manufactures are sword blades, carpets, shoes, sheepskin caps, and rosewater made from flowers grown in magnificent gardens in the vicinity. Herat was founded by Alexander the Great, and its history has been one long series of conquests. It came under the rule of Arabs in the seventh century, was captured by Timur in 1381 and by the Persians in 1510. At times the inhabitants regained their independence, but finally fell under the sway of the Afghans, who occupied the city in 1749 and again in 1863. Population in 1910, estimated at 10,000.

HERBARIUM, *her ba'ri um*, a classified, systematically-arranged collection of dried plants. As the study of living plants in their natural surroundings is possible only in a limited way, herbariums are invaluable in school work. The best herbariums have specimens of plants from which the original descriptions of the various species were made. Those specimens are called *types*. By studying them in comparison with existing plants, relationships can be established and histories of plant families read. Next in importance to type specimens are specimens of plants obtained from comparatively inaccessible regions, sent in by collectors who daily risk their lives in the cause of science.

Herbarium plants are usually mounted on sheets of white paper, and the best specimens show root, leaf, flower and fruit. These sheets are marked with the name of the species, natural color, etc., name of collector and date and place of gathering.

The oldest and one of the greatest herbariums in the United States is the *Gray Herbarium*, the labor of the great botanist, Asa Gray, and given by him to Harvard University. Ranking with it are the herbarium of the New York Botanical Garden, the United States national herbarium, and the herbarium of McGill University, Montreal. In addition to these there are numerous smaller ones in museums and colleges throughout America.

In the herbarium of the Jardin des Plantes of Paris there are a great many of the type specimens from which American plants were named. The greatest of all dried plant collections is in Great Britain, at the Royal Gardens at Kew.

HERBART, *hehr'bahrt*, JOHANN FRIEDRICH (1776-1841), a German philosopher and the founder of modern pedagogy. Few philosophers or educators of any time or country have had a wider and more lasting influence than has

Herbart. His educational doctrine was the outgrowth of his philosophy, and his writings on education have exerted great influence upon the systems of education in Europe and America. Herbart believed that all subjects were related, and that the knowledge of one was strengthened by the knowledge of others. He was the orginator of the doctrine of apperception, which means the interpreting of new knowledge by the knowledge already in the mind (see APPERCEPTION). His entire system is based upon the idea that the end and aim of education is the development of the individual, whom he places above the family or the state. In his system of instruction morality held the chief place. He placed special stress upon the development of interest, which, before his time, had received little attention. He advocated the correlation and unification of studies, and such methods of instruction as would vitalize school subjects and make them real to the children.

HERBART

He believed continuous evolutionary growth to be the basic principle of the world, and he applied it to methods in education.

Herbart founded a pedagogical seminary at Königsberg to which students came from other European countries and from the United States. Although the institution was compelled to close in 1833 because of the hostility of the Prussian government, it continued long enough to train a number of men who established Herbart's system in other countries, so that we can truly say that the Königsberg Seminary was the institution in which the "New Education" had its birth.

His Quiet Life. Herbart was born at Oldenburg on May 4, 1776, and his life, despite the fact that it came to maturity during the troubled times of the French Revolution and its succeeding wars, was a peaceful one. He studied at the University of Jena, and was there a pupil of Fichte, whose philosophy he adopted ardently for a time but later rejected. He taught at the University of Göttingen, at Königsberg, and then again at Göttingen, where he died. Such was his uneventful career. The wars of Germany did not tempt him; never, so far as is known, did he even think of carrying a weapon in her battles, but he helped to establish for his country a high place in the world of thought. His works, most of which have been translated into English, include *General Pedagogy, Introduction to Philosophy, Application of Psychology to the Science of Education* and *A B C of Sense-Perception.*

Consult De Garmo's *Herbart and the Herbartians;* Adams's *The Herbartian Psychology Applied to Education.*

HER'BERT, VICTOR (1859-), musician and composer of light operas and musical comedies, and a music director of international reputation. He was born in Dublin, Ireland. After years of study in Germany and a tour of Europe, he accepted the position of solo 'cellist with the Metropolitan Opera Company, New York City, in 1886. Later he became bandmaster of the famous Twenty-second Regiment Band; thereafter, until 1904, he was conductor of the Pittsburgh Symphony Orchestra. Since that he has devoted his time to his compositions, with much success. His operas, including *Princess Pat, The Singing Girl, Babes in Toyland* and about twenty-five others, are notable for the easy flow of rhythmic melody and extraordinary command of the technique of composition. His *Natoma* is one of the few attempts in the United States to produce American grand opera, with American scenes and American history as its inspiration. His most important composition for the 'cello is a second concerto in E minor, opus 30.

HERBICIDES, *hur'bi sydz,* chemical preparations employed to kill weeds (which see).

HERBS, a term which in botany applies to all plants which contain no woody tissue and usually die down to the ground when their growing season is over. Thus herbs are distinguished from shrubs and trees. The word comes from the Latin *herba,* meaning *grass, green stalks,* or *blades.* In popular usage, however, it refers to herbaceous plants of economic value used for their flavor in cooking, for their scent in perfumes or for their properties in medicine. Only the leaves of some are used, as with sage; both leaves and stalk of others are valuable, as with celery. The buds and flowers of capers and saffron; the roots of such herbs as onions; the seeds of others, like dill; and the fruits of some, as of peppers, are the portions of economic value. Some of the herbs in most common use to-day are parsley, onions, sage, thyme, mint, hop and caraway. Others

are anise, balm, cicely, catnip, coriander, fennel, horehound, hyssop, lavender, marjoram, pennyroyal, rosemary, sorrel, tansy, wintergreen and wormwood.

Sweet herbs were among the first plants cultivated in Europe, for in materially changing the flavors of meats by their use, it may be said that almost a new animal was created for the meat-loving Romans. Many herbs once highly prized, however, are seldom used to-day. It is true that they have little or no food value, but they make dishes savory and prove an economy in making very palatable dishes of "left-overs." A garden of old-fashioned herbs would be not only interesting, but useful. Most of them can be grown with little care. Planting in good, well-worked soil in a sunny spot, keeping the surface soil loose and removing weeds, are the chief special attentions necessary.

Related Subjects. All the herbs mentioned in the article above are given detailed treatment under their own names in these volumes.

HERCULANEUM, *her ku la' ne um,* an ancient city of Italy, memorable not for its life but for its death, which was brought about by the same volcanic eruption that destroyed Pompeii. It stood at the foot of Mount Vesuvius, five or six miles from Naples, and its fortifications and its artistic treasures were known throughout Italy. In A. D. 63 an earthquake shook it, but the damage was repaired, and for sixteen years longer the city stood. Then came the great eruption of Vesuvius, in A. D. 79, and Herculaneum perished. Again and again, through the centuries, Vesuvius poured out its lava and ashes, and the last trace of the city was lost. Scholars looked for it, but never found it, and villages grew up above its site. In 1709, in one of these villages, a farmer sunk a well, and there, far below the surface, were found marble sculptures. Ten years later another shaft was sunk, and the old theater was discovered, but little was done toward further excavation until 1738, when the government of Naples took up the task.

Since then excavations have been carried on at intervals, but they have been very difficult, for the villages above must always be safeguarded. However, it is known that here, from 30 to 120 feet beneath the surface, lies the city, with its houses, its temples and its beautiful villas, just as it was over eighteen centuries ago, when the people heeded the warning signs from Vesuvius and fled. It seems that most of the people must have escaped, as very few skeletons have been found. Perhaps the strangest thing in connection with the excavation has been the finding in a room of a villa of a large store of provisions—grain, figs, oil, peas, and even hams.

But there are far more valuable things than these, and the National Museum at Naples has a wonderful exhibit of marble and bronze statues, of paintings and of papyrus rolls taken from the buried city. The manuscripts, from their long burial, are so discolored and brittle that it has been a task of extreme delicacy to unroll and decipher them, but some have well repaid the trouble. All in all, no discovery ever made has cast more light on ancient customs and manner of life than the uncovering of Herculaneum. See POMPEII; VESUVIUS.

Read Lytton's *Last Days of Pompeii;* it will be found valuable in this connection. Consult Barker's *Buried Herculaneum.*

HERCULES, *hur' ku leez,* the great national hero of the ancient Greeks, famed for his surpassing strength and mighty deeds of valor and endurance. In the myths of Hercules the ancients gave expression to their worship of all that was manly and heroic. The great mythical hero was said to be the son of Zeus, the greatest of the gods, and Alcmene, a princess of mortal origin. When the tidings of his birth were conveyed to Hera, queen of the gods, she determined that the child of her rival should perish, and forthwith sent two gigantic serpents to the palace where he was lying in his cradle. Just as they were about to crush him in their folds, the baby Hercules caught them by the neck and strangled them.

THE FARNESE HERCULES
In the National Museum, Naples.

The education of the boy was supervised by Chiron, a famous centaur (which see), who taught him the use of all weapons and gave him training in the various athletic sports.

When his education was completed he went forth into the world, and in the course of time was happily married to Megara, daughter of Creon, king of Thebes. While he was enjoying a peaceful and prosperous life, Hera, still his bitter enemy, caused him to be seized with madness, and in this condition he killed his wife and three children. When he regained his reason he suffered untold agony and remorse for his terrible deed, to atone for which he offered his services to his cousin Eurystheus, king of Argus. Twelve mighty labors were imposed by his royal master as deeds of atonement. Says Theocritus:

Unto this thy son it shall be given
With his broad heart to win his way to heaven;
Twelve labors shall he work; and all accurst
And brutal things o'erthrow, brute men the worst.

The Twelve Labors. (1) The first labor was the destruction of a bloodthirsty lion which had made its lair in the Nemean Forest. Boldly entering the den of the monster, he grasped it by the throat and strangled it to death, after which he made for himself a coat of its shaggy skin.

(2) For his second task he slew the Hydra, a seven-headed serpent that was ravaging the marshes of Lerna (see HYDRA).

(3) The third labor imposed by Eurystheus was the capture of the golden-horned stag of Cerynea, whose brazen feet carried him along so swiftly they seemed scarcely to touch the ground. Hercules overtook this fleet animal after a long, weary chase, but succeeded in capturing him only by driving him into a far northern snowdrift from which he could not make his escape.

(4) The capture of the wild boar of Erymanthus, in Arcadia, was his fourth desperate adventure. In the midst of this labor he was attacked by the centaurs, whom he vanquished by turning upon them his death-bringing arrows.

(5) Hercules was next commanded to cleanse the stables of Augeas, king of Elis, to accomplish which he used the rushing torrent of the River Alpheus.

(6) For his sixth task he was sent forth to slay the brazen-clawed birds that hovered over the waters of Lake Stymphalus, and that ate of human flesh. With his poisoned arrows he destroyed the entire flock of these savage birds.

(7) His seventh labor was the capture of a mad bull given by Neptune to Minos, king of Crete, which in its frenzy was laying waste the entire island.

(8) He next journeyed to Thrace, whose king, Diomedes, owned a number of beautiful horses that fed on human flesh. As his eighth labor Hercules delivered these fearful steeds to Eurystheus.

(9) On his ninth adventure he visited the country of the Amazons (which see), to obtain for the daughter of Eurystheus the girdle worn by the Amazon queen, Hippolyta. This prize he bore away only after he had fought and defeated the warlike race of women, who were misled by Hera into believing that the hero had come to kidnap their queen.

(10) His tenth task was the capture of the oxen of Geryon, a creature with three bodies who made his home in the island of Erythea. This island lay far to the west, bathed in the light of the setting sun, and to reach it Hercules had to pass through many different countries. When he came to the frontiers of Libya and Europe, he raised as memorials of his journey the two mountains of Abyla and Calpe, the famous Pillars of Hercules (see GIBRALTAR; HERCULES, PILLARS OF). On reaching Erythea, he slew the warders of the oxen, the giant Eurytion and his two-headed dog, and bore his trophies back in triumph to Eurystheus.

(11) Even more difficult than this was the eleventh labor, the seizure of the golden apples of the Hesperides (which see). To secure these he must needs ask the help of Atlas, father of the Hesperides, who—

With head inclined and ever-during arms,
Sustains the spacious heavens.

Hercules himself bore on his shoulders the mighty burden while Atlas plucked the glittering fruit from the gardens (see ATLAS).

(12) His final task was the most difficult of all, the descent into the realm of Pluto, the god of the lower world, to bring up the dog Cerberus, grim guardian of Hades (see CERBERUS). When he laid the ferocious monster at the feet of Eurystheus, that king fled in terror and hid himself in a huge jar.

After His Atonement. When all his labors were completed the hero wandered forth to enjoy the happiness of long-desired freedom. Too soon, however, was he forced to return to bondage, for, having slain his friend Iphitus in a fit of anger, he was condemned to serve Omphale, queen of Lydia, for a period of three years. Omphale clad herself in his lion's skin and made her hero-slave dress in a woman's garb, while with awkward hands he worked at spinning.

After he had been released from the Lydian queen, he married Deianira, who accompanied him in his wanderings. One day they came to a rapidly-flowing stream, across which Deianira was carried by the centaur, Nessus. The centaur, on reaching the opposite shore, started to run away with his fair burden, and Hercules, hearing her cries, shot her captor with one of his poisoned arrows. Nessus, with his dying breath, bade Deianira dip in his blood a robe of Hercules, which he said would bring back her husband's love if ever it wandered from her.

When, some time later, she became jealous of Iole, a captive maiden, she unwittingly sent to Hercules the robe, poisoned with the blood of Nessus. The hero at once put it on, and as the poison penetrated his body, in a frenzy of pain he tried to wrench away the garment, but only tore off great pieces of his own flesh.

In his agony he uprooted great pines, and Lichas, who had brought the robe to him, he flung into the sea from the heights of Mount Oeta. Finally, to end the unbearable pain, he erected a huge funeral pile on the mountain, laid himself upon it, and commanded his friend Philoctetes to apply the torch. When the flames had consumed all of him that was mortal, great Zeus descended from heaven and bore away his soul to the abode of the gods, where, wedded to the goddess Hebe, he lived in everlasting happiness.

There are several famous representations of Hercules in painting and sculpture. The original of the illustration on page 2779, the *Farnese Hercules,* is in the National Museum at Naples. Other notable works on the subject include the *Infant Hercules Strangling a Serpent* (antique sculpture) in the Uffizi at Florence; C. C. Cleyre's painting, *Hercules at the Feet of Omphale,* in the Louvre, Paris; and Guido Reni's painting, *Hercules Fighting the Hydra,* also in the Louvre. J.F.C.

Consult Gayley's *Classic Myths in English Literature and in Art;* Winter's *Myths of Hercules.*

HERCULES, PILLARS OF, an ancient name given to the two rocks at the sides of the narrow entrance to the Mediterranean Sea at the Strait of Gibraltar. One pillar, on the European side, was called Calpe; the other, on the African side, Abyla. The ancient Greeks ascribed their erection to Hercules on the occasion of his journey to the kingdom of Geryon. A thousand years before Christ the pillars were crowned by silver columns erected by the Phoenician mariners to mark the limits of navigation; there is a legend to the effect that they bore a warning to over-ambitious mariners, in the words *Ne plus ultra* (no more beyond).

HERCULES BEETLE, *be'tl,* a remarkably large and strong beetle, found in the West Indies and in tropical America. The male attains a length of five inches. The insect has long, curving horns projecting from the head and thorax; these are curved to meet each other and are used as forceps — according to some authorities, as saws. The female is much smaller than the male, and has no horns. Two species of Hercules beetles are found in the Southern United States; the largest is of a greenish-gray color.

HERCULES BEETLE

HEREDITY, *he·red'i·ti.* Herbert Spencer defines heredity as "the capacity of every plant and animal to reproduce other individuals of a like kind." The child is like the parent in form, structure, general characteristics and habits of life. It does not bear a perfect resemblance to either parent, but usually has some characteristics of each. There are, however, certain characteristics pertaining to each child which vary from those of the parents, and of the other children. While these variations are numerous they are minute as compared with the likenesses. This law of heredity is necessary to the maintenance of life. Says an eminent authority, "If the offspring are to live in the same environments, they must closely resemble their parents. Step by step, from the germ to the adult, the child treads in the developmental footsteps of the parent."

Notwithstanding the prolonged efforts of scientists to discover the real cause of heredity, much still remains to be learned. Some facts, however, are fully established. We do not know why some characteristics are reproduced more frequently than others, but we know that if both parents have blue eyes and light hair these characteristics will appear in the children with rarely an exception. If one of the parents has light hair and blue eyes and the other dark hair and eyes, some of the children will resemble one parent and some the other in these characteristics. Sometimes a child resembles one of the grandparents more closely than it does its parents, occasionally it may bear characteristics of an aunt or uncle, and now and then there is a reversion to a more remote ancestor (see ATAVISM). Sir Francis Galton gave the following law of expectation of inherited characteristics: "Of the entire heritage of the offspring, the two parents contribute one-half, the four grandparents one-fourth, the eight great grandparents one-sixteenth and so on in diminishing ratio until the sum of the fractions equals one." From extended experiments with plants Mendel discovered that the offspring inherited the characters of one parent to the exclusion of those of the other, and recent investigations show this to be true of animals as well. Racial characteristics, such as the curly hair and thick lips of the negro and the high cheek bones and straight hair of the Indian, are inherited from generation to generation, but the inheritance of individual characteristics is more uncertain. That is, the child may not resemble

either parent in features, and its mental aptitudes may be entirely different from theirs. Moreover, environment exerts a strong influence over individual inheritance. If previous to the birth of her child the mother lives under conditions that induce worry and fretfulness, the child is likely to possess these characteristics. The child born to a mother under ideal prenatal conditions is more likely to possess a loving and pleasant disposition.

Mental Traits. The inheritance of mental traits has been studied for a long time. Psychologists, recognizing the interdependence of mind and body, have shown beyond doubt that parents transmit health or disease, strength or weakness, both physical and mental, to their children to a far greater extent than many of them realize. The statistics of criminologists show that the great majority of criminals are born defective, weak in mind or body, or both, so that their powers of resistance are weak. Marriage of defectives results almost inevitably in defective children. If those criminally inclined marry, their children are likely to have the same tendencies. The inhabitants of small, isolated communities, like those on small islands, are likely to degenerate because of the continuous intermarrying in families closely related. There are many illustrations of this fact.

The child who is well born is fortunate, and if in addition both mother and child have the advantages of an ideal environment the new being starts life with many obstacles removed from his pathway to success. Oliver Wendell Holmes was once asked when the training of a child should begin. He replied, "With his grandparents." W.F.R.

Consult Parker's *Biology and Social Problems;* Darbishire's *Breeding and The Mendelian Discovery.*

Related Subjects. The following subjects are closely related to this topic, and should be read in connection with it:

Breeding	Eugenics
Criminology	Evolution

HERESY, *hehr'e si,* an opinion or doctrine of a member of any Church which is contrary to the established creed of that Church. The person whose ideas differ from the accepted belief is called a *heretic.* Heresy, which by many members in churches was considered a wrong and exceedingly pernicious belief, was punished by death until religious freedom obtained full sway among the nations. From the thirteenth to the sixteenth centuries, heretics were persecuted in Spain, Italy and France, while in England many were burned at the stake. Such reformers as Wycliffe, Huss and Luther were considered as heretics by the Roman Catholic Church. In modern times religious freedom is so extensive that in practically all countries a man is permitted to hold any belief that appeals to him as right. See WYCLIFFE, JOHN; HUSS, JOHN; LUTHER, MARTIN. G.W.M.

HERMES, *hur'meez.* See MERCURY.

HER'MIT CRAB, a strange crab which has been called the cuckoo of the seashore, for, like the cuckoo, it does not build a home of its own (see CUCKOO). It uses the cast-off spiral shells of other creatures, or sometimes drags out the occupant of a desirable shell and devours the poor victim in order to obtain its home. Unlike other crabs, the hermit crab has a soft, unprotected tail. It is to shelter that tail that a shell is needed. As the crab increases in size, it changes to a larger shell. So firmly does the hermit attach itself to its home, by means of strong hooks at the end of the body, that it is impossible to draw it out without tearing the body. The habit of living alone in a house no doubt suggested the name hermit.

HERMIT CRAB
In its borrowed shell.

There are several species of hermit crab of various sizes, most of them belonging to tropical shores. A species common on the Atlantic coast of the United States is the short-armed hermit. Fishermen call it *jack-in-the-box, thief* and *stone lobster.* The latter name is given through a superstitious belief that it turns into a lobster. See CRAB.

HERMITS, persons who withdraw from society and live alone, usually for religious contemplation and with a view to avoiding the temptations and cares of the world. The early centuries, notably the third, witnessed a great development of this practice. The first hermit is said to have been Paul of Thebes, who fled to the Egyptian desert, where he lived for ninety years. This solitary life also began among the Christians in the period of persecution. Communities were formed through the influence of Saint Anthony, who is known as

the father of homes for the monks, where each member had a solitary dwelling, but all came together for worship. These communities finally grew into monasteries, or convents, and the number of hermits became gradually fewer. The solitary penitent, or devotee, is a feature of many religions, both ancient and modern.

Considered apart from religion, there are few people in civilized countries who can be called hermits. Occasionally there is known to be a person who withdraws from association with other men and lives alone, but he has no object other than seclusion.

HERNE, JAMES A. (1840-1901), whose real name was JAMES AHERNE, was an American actor and dramatist. The character of his plays indicates the sterling worth of their author. He was born in Troy, N. Y., and after a brief experience as an actor while yet a young man, he appeared in his native city in *Uncle Tom's Cabin.* The most successful plays in which he starred were *Hearts of Oak* and *Shore Acres,* and these were written by himself; they were quaint, rural comedies skilfully portraying types of everyday life. His other writings include *Drifting Apart, The Minute Men* and *Sag Harbor,* a New England coast comedy.

HERNIA, *hur'ni a.* When the wall of the abdomen becomes weakened or, through a sudden strain, becomes ruptured, the condition is called *hernia.* This consists of a protrusion of the intestines through a false opening in the abdominal walls. The term properly means a *tumor,* and signifies the protrusion of any organ of the body through an accidental opening.

The danger of hernia, using the common meaning of the word, is in the shutting off or choking of the knuckle of the protruding intestine. This is called *strangulation,* and calls for immediate operation or the patient will die. A person who develops abdominal hernia should wear a truss or other support to keep the intestine inside the abdominal cavity; or, better, there should be an operation to close the false opening, which constantly tends to become larger the longer it is neglected.

HE'RO, in mythology, the beautiful priestess who placed a bright light at the top of her lonely tower each night, to guide her lover, Leander, as he swam across the Hellespont to see her (see HELLESPONT). No one suspected their meetings, and all went well until the first severe storms of winter swept over the sea. Then one morning, after watching all night in the storm, Hero found the body of her lover tossing on the waves at the foot of her tower. In despair she threw herself into the sea and perished at his side. Lord Byron, the English poet, attempted Leander's feat of swimming across the Hellespont, and upon his return from the adventure wrote:

> His eye but saw that light of love,
> The only star it hail'd above;
> His ear but rang with Hero's song,
> "Ye waves, divide not lovers long."

HEROD, *her'ud,* the family name of a group of remarkable rulers whose members occupied prominent governmental positions in various provinces of Palestine about the time of Christ. The first and most famous was Herod the Great, the son of an Idumaean father and mother; the family was not Jewish, although the Herods had been compelled to adopt the Jewish religion by their conquerors in 125 B.C.

Herod the Great (74-4 B.C.), the wicked king of Judea, was often called the "murderer of the innocents," because at the birth of Christ, in the latter part of his reign, he caused all male children under two years of age to be slain (*Matthew* II, 16). This was done for the reason that Christ had been proclaimed the future king of the Jews; Herod, upon being unable to find him, caused all to be killed that he might not miss putting this one out of the way so he could not later appear and seize the throne.

Herod was the second son of Antipater, whom Caesar made governor of Judea, and in 46 B.C. he became ruler of Galilee. Seven years later, after the assassination of his father, he was appointed king by the Roman Senate, but it was not until 37 B.C. that he succeeded in putting down the forces opposing him by capturing Jerusalem. After putting to death many of the opposite party, he set up a magnificent empire. He had ten wives, and much of his life was spent in putting down plots of his various sons to obtain possession of the throne. All Judea rejoiced at his death.

Herod Antipas (? - A.D. 39), the crafty tetrarch of Galilee who beheaded John the Baptist, although his wife, Herodias, was the prime mover in the act. He was the son of Herod the Great by his Samaritan wife Malthace, but at his father's death in 4 B.C. the kingdom was given to his brother Archelaus, so in Galilee he made Sepphoris his capital, rebuilding most of the city. After marrying a daughter of Aretas, king of the Arabs, he

divorced her to marry Herodias, the wife of his half-brother, Herod Philip. This brought on a war with Aretas, in which Antipas was routed, for he lacked his father's ability in war and also his diplomacy. Herodias made a tool of him; urged by her, he went to Rome and demanded of Caligula that he be made king, as had Agrippa I. Instead, he was confronted by false charges from Agrippa himself and banished to Lyons in Gaul, in A. D. 39, where he soon died. He is the Herod most frequently mentioned in the Bible, for it was to him that Pilate sent Jesus just before the Crucifixion (*Luke* XXIII, 7).

Herod Agrippa I (10 B. C.-A.D. 44), the ambitious king of Judea who obtained control of the entire territory over which his grandfather, Herod the Great, had ruled. He caused the death of Saint James (*Acts* XII, 2), and had Saint Peter imprisoned to please the Jews, with whom his rule was very popular. As the son of Aristobulus, he was educated at Rome with Drusus, the son of Emperor Tiberius, where he cultivated very luxurious tastes. For rash words spoken in favor of Caligula he was imprisoned by Tiberius, but six months later, on the accession of Caligula to the throne, he was given the provinces which had belonged to Philip and Lysanias. When Herod Antipas was banished, Galilee was included in Agrippa's territory and in A. D. 41 Claudius, who had just become emperor, added Judea and Samaria to his kingdom, which now equaled that of Herod the Great. His sudden death is described in *Acts* XII, 20-23.

Herod Agrippa II (A. D. 27-100), the king over the provinces of Philip, Lysanias and Varus, before whom Paul was brought by Festus, where he entirely cleared himself of charges on the eve of being taken to Rome (*Acts* XXV, 12; XXVI, 32). At the death of the father, Agrippa I, Claudius, who was then emperor, was persuaded not to give the kingdom to the son Agrippa II on account of his extreme youth, for he was only seventeen; so all of Palestine passed under direct Roman rule, with a procurator placed over each of the provinces. In A. D. 50 he was made king of Chalcis, at the death of an uncle who had ruled the territory, but later he surrendered it for the provinces which he afterward ruled. He possessed the family passion for building gorgeous cities, but was unlike his father, who was much interested in the Jews and their welfare. When the troubles which ended in the Jewish war against Rome began, Agrippa II tried to prevent the Jews from making armed resistance, but as it was useless he remained loyal to the emperor by fighting with Vespasian. Later he was made praetor. E.C.

HERODOTUS, *he rod' o tus* (about 484 - about 424 B. C.), a Greek historian of antiquity, the first writer of historic narrative which was artistic and unified. He therefore deserves the title, "Father of History," conferred upon him by Cicero. He was born at Halicarnassus, a famous city of Asia Minor. During the early years of his manhood he traveled far and wide, visiting the shores of the Hellespont and of the Euxine, Scythia, Syria, Palestine, Babylon, Egypt and the Greek colonies on the northern coast of Africa. Everywhere he studied the manners, customs and religion of the people, the history of the country and the productions of the soil, and his imperishable *History* is based on what he saw and what he was told in these travels. About 447 B. C. he visited Athens, then at the height of its intellectual glory, and three years later joined the colony which was being founded by Pericles in Southern Italy. Of the rest of his life nothing is known, but, according to tradition, he died and was buried at Thurii.

The great historical work on which the fame of Herodotus rests consists of nine books. In these he tells the story of the rise of the free states of Greece and their struggle with the invading hosts of the kings of Persia. His pages are alive with human interest and brightened with innumerable stories and anecdotes, not all of which he himself believed, however. His simple, unaffected style has been the delight of critics from his own time down to the present.

HERON, *hehr'un,* a quiet, solemn, wading bird, found chiefly in tropical and subtropical swamps and shallow rivers, but also seen in temperate zones. About seventy-five species are known. One species, the *blue heron,* is pictured on the screens, fans and pottery of Japanese artists. Other species, known as *egrets* (which see), are known principally through the greed of plume hunters, for they are to-day practically extinct in many of their former haunts. The characteristics of all are the same, the chief differences being in size and plumage.

Characteristics. These graceful birds are easily distinguished by their long, sharply-pointed bills, which seem to extend into the eyes; by narrow heads and long, slender necks, and by their naked, storklike legs and mod-

erately sized wings. Their four toes are on the same level, three in front and one behind. The tails are short, rounded and compressed. Herons are able to strike heavy blows with their powerful necks and strong beaks. Many species have long, ornamental crests and handsome plumes on throat and body, especially during breeding time. All have three pairs of

HERONS

At left, the great blue heron; at right, the snowy heron.

peculiar feathers called "powder-down tracts," whose purpose is not yet known. One pair of these is on the breast, one on the rump and one under the thighs.

In flight, herons are not so handsome as on land, for they stretch their long legs straight out behind them and, unlike the cranes, curl their heads between their shoulders. But at a distance their flight seems majestic and is quite as impressive as that of an eagle. Some herons live in flocks, while others live singly or in pairs. Their nests are loose, crude masses of sticks, built in treetops or in bushes near the place of feeding. From three to six eggs are laid, which hatch into helpless, scrawny little birds which must be fed for two or three weeks before they are able to fly and shift for themselves.

Silent and alone the heron stalks along the shores of streams with stately stride, looking for things to eat; or, hour after hour, with head drawn between the shoulders, statuelike and apparently asleep, it stands, patiently watching for fish, frogs or small reptiles. Once seen, however, its prey is caught with a lightning dart of graceful neck and spearlike bill. The heron's only cry is a hollow squawk which Longfellow mentions in *Hiawatha* as "a cry of lamentation." Herons are ordinarily long-lived birds and have been known to exist as many as sixty years.

American Herons. About twelve species of heron are known in America. One of the most common is the shy, fifty-inch *great blue heron,* which nests as far north as Labrador, Hudson Bay and Alaska. It is often incorrectly called a *crane.* A colony of this slaty-gray species, the largest of herons, nested near the home of Lowell, and Longfellow wrote about them in his *The Herons of Elmwood.* The *little blue heron* and *snowy heron* are better known as *egrets.* The most abundant, as well as the smallest, of American herons is the sixteen- to eighteen-inch *little green heron.* It is found from tropical America far into Canada and is known by the boys as *shitepoke,* or *fly up the creek.* The *black-crowned night heron* is more fully described under NIGHT HERON. See also BITTERN; STORK. M.S.

Consult Newton's *Dictionary of Birds; Biological Survey Bulletin 45,* of the United States Department of the Interior.

HERRERA, *er·ra'rah,* FRANCISCO, the name of two distinguished Spanish painters who were born in Seville. The father (1576-1656), surnamed *el Viejo* (the Elder), is regarded as the founder of a new national school of painting. His *Last Judgment* is a masterpiece of design and coloring. In addition to historical pieces, he displayed skill in fresco painting and in bronze work. Some of his best works are now in the Louvre at Paris.

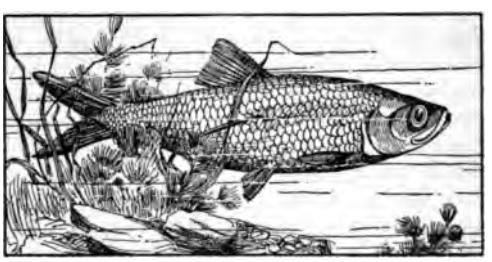
His youngest son (1622-1685), surnamed *el Mozo* (the Younger), became celebrated for pictures of still life, especially for fish pieces. He was painter for Philip IV of Spain and superintendent of the royal buildings. His best known works are a fresco, *The Ascension,* now in the Atocha Church in Madrid, and *San Francisco,* in the Seville Cathedral.

HERRICK, ROBERT (1591-1674), an English poet, born in London and educated at Cambridge. In 1629 he accepted the vicarship of Dean Prior, Devonshire, but he espoused the cause of the king, Charles I, and opposed the growing Puritan power, so his royalist principles lost him his post in 1647. He then went to London, where he published *Hesperides* and *Noble Numbers.* In 1662, after the Restoration, he was reinstated in his old living, where

he remained until his death. Herrick's verses are distinguished by their exquisite sentiment, fine poetic quality and descriptive beauty. For a considerable period following his death they suffered an undeserved neglect, but beginning with the nineteenth century there came a merited revival. Among his most popular poems are *Corinna's Maying, Cherry Ripe* and *Gather Ye Rosebuds While Ye May.*

HERRICK, ROBERT [WELCH] (1868-), an American novelist who ranks among the foremost present-day fiction writers. Of his numerous novels perhaps the most noteworthy are *The Gospel of Freedom, the Common Lot, Together* and *The Healer,* while among his shorter stories *The Master of the Inn* has a peculiar, fresh charm. Whether he deals with the struggle of woman for freedom, the conflict between a man's ideals and his lust for success or the problem of the modern American marriage, he shows the same admirable literary sense and the same power of character analysis. Herrick was born at Cambridge, Mass., studied at Harvard University, and since 1893 has been professor of rhetoric and English literature at the University of Chicago.

HER'RING, a food fish which is considered the most important in the world, although it is not so extensively used in America as in Europe. It is the member of the herring family which gives that group of fishes its name.



OX-EYED HERRING

To that family belong the shad, menhaden, sardine and anchovy. The name is from the German *heer,* meaning *army,* referring to the immense shoals of many millions of individuals in which these fish live. Common herring are numerous along the coasts in the temperate and colder parts of the North Atlantic Ocean, and vast numbers are taken from the North Sea, but various other species are found in the Pacific Ocean as well.

Herring Characteristics. The average length of herring is twelve inches. Judging their age by the number of rings on the scales, it was discovered that about half of the herring taken in one year of observation were ten years old. They are well-formed fish, with thin scales, blue-green above and of a brilliant silvery-white below. Both jaws have very small teeth. Their principal food consists of small shellfish, such as shrimps and copepods, or *red seeds.* Millions of herring swim close together near the surface of the water, in areas of from six to twenty square miles. According to species and temperature of water, herring spend part of the time in deep waters, then migrate to shallower waters of coasts. It is near the coasts that the eggs are laid, because they need oxygen, heat and sunlight in order to hatch and develop. From 10,000 to 40,000 eggs are laid yearly by each female. Settling to the bottom of the water, they cover seaweed and rocks for miles. Within a few weeks the eggs hatch. There are numerous herring enemies, however, and although herring are plentiful, their number is greatly reduced by crabs and fish which eat the eggs and young. The adult herring are captured not only by other creatures of the sea, such as the whale, porpoise, seal, cod, haddock, etc., but by eagles, cormorants, gulls and many other birds. It is well to note that nature provides vast numbers of young of those fishes which are the natural prey of larger species.

The Herring Industry. It is when vast numbers of birds are seen hovering over the shallow waters that fishermen know that schools of herring have come to lay their eggs. When those welcome signs appear, thousands of men go forth to make their yearly hauls. The herring fishing industry is attended with danger, especially in the North Sea, which is noted for its destructive gales. But the fishermen of the surrounding countries, England, France, Sweden and Norway, are brave and sturdy, and each year they risk their lives and suffer hardships in this calling.

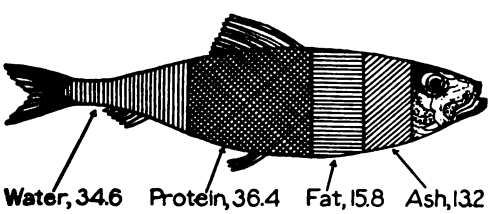
The principal herring fisheries are conducted by means of large, clumsy sail or power boats called *luggers.* This name became well known throughout the world during the War of the Nations, when naval necessities drove them from the North Sea. In normal times they go out to a spot where a large number of herring are seen and an immense seine is let out from the boat to surround the shoal. The crew then row along the edges of the seine in small boats and force the mass of fish nearer the lugger. Then, when as many herring as possible have been surrounded, the

lugger approaches, and hundreds of thousands of the shining creatures are raised in the large net and thrown into the boat.

Gill nets are also used in herring fisheries, and also fish-traps called *weirs*. In some places the old method of going out at night, luring the fish to the boat by means of a lighted torch, then dipping them up, is still in use.

Although the War of the Nations temporarily destroyed the North Sea fisheries, previous records show that the world's annual catch of herring has been 1,500,000,000 pounds. Of that catch 125,000,000 pounds were secured by United States fishermen at a value to them of $800,000. The Canadian herring fisheries have been estimated at about 235,000,000 pounds, valued at about $2,000,000. The balance of 1,147,000,000 pounds is chiefly the catch of the European countries listed above, and might be valued at a possible $20,000,000. Norway leads the other countries of the world in the amount procured each year.

Uses of Herring. Many herring are frozen and used for bait in cod fisheries. Millions are made into fertilizer, and the oil extracted is used for machinery and other purposes. Others are pickled or smoked and sold as food



FOOD VALUE OF SMOKED HERRING

The fuel value of this fish is 1,305 calories per pound—about equal to that of porterhouse steak and one-half more valuable than that of veal.

fish. Large quantities are eaten fresh. Herring which have been smoked but not salted are known in England as *Yarmouth bloaters*. Those similarly prepared, but also split and cleaned, are called *kippered herring*. They are put in tins in Scotland and Norway and sent to America, where they are regarded as the most appetising form of herring. Small herring are often put into tins and sold as *sardines*, and in London they are sold as *whitebait*, a celebrated dainty dish. Pickled herring, that is, those which are put into brine, sometimes with onions and spices, are sold either *round* or *split*. The former are salted whole; in the latter the gills, heart and other parts have been removed. See FISH, subtitle *Deep-Sea Fisheries*. G.W.

HERSCHEL, *hur'shel*, the family name of three famous English astronomers. SIR WILLIAM HERSCHEL (1738-1822) was the first to convey to the human mind any conception of the immensity of the heavens. While observing what he supposed to be a comet he discovered a new planet; this distinction won him the position of private astronomer to George III, by whom he was later knighted. He discovered Uranus and what he took for its six satellites, and also located two satellites of Saturn; he detected the rotation of Saturn's ring, the period of rotation of Saturn itself, and that of Venus. His catalogue of double stars, nebulae, etc., his tables of the comparative brightness of stars and his researches in regard to light and heat place him among the foremost of modern astronomers and natural philosophers.

Caroline Lucretia Herschel (1750-1848), like her illustrious brother William, was born in Hanover, Germany, but early followed him to England, where she acted as his capable assistant, sharing his labors and his distinctions. With a small Newtonian telescope, made for her by her brother, she made many independent observations in regard to comets, of which she discovered eight. She also discovered several nebulae and clusters of stars.

Sir John Frederick William Herschel (1792-1871), son of William Herschel, at first interested himself in reëxamining the nebulae and clusters of stars described in his father's catalogues, and he added many similar bodies to his own list. His father had explored the northern heavens; he determined to explore the heavens of the south, as well as reëxplore the north. This constituted his important life work, for at the Cape of Good Hope he made a complete telescopic survey of the heavens, his observations covering a period of four years. For this contribution to astronomical research he was made a baronet by Queen Victoria and honored by Oxford University. He was also distinguished as a chemist, and attained important results in photography. His literary bent is discerned in his translations from Schiller and from the *Iliad*. He was buried in Westminster Abbey, near Sir Isaac Newton.

HES'PELER, a town in Waterloo County, Ontario, founded in 1858 by Jacob Hespeler, for whom it was named. It is situated in the southern part of the province, on the River Speed, five miles north of Galt, nine miles south of Guelph and fifty-eight miles south-

west of Toronto. Railway transportation is provided by the Grand Trunk Railway, and an electric line connects with the Canadian Pacific Railway at Galt. The people of Hespeler are largely engaged in making woolen cloth and woolen apparel; over 700 people are employed in these mills. Other establishments make enameled ware, furniture, woodworking machinery, stoves and furnaces. The town hall was completed in 1916 at a cost of $40,000. The surrounding district is well adapted to fruit, truck farming and dairying. In 1911 the population, chiefly Canadian, was 2,368. R.E.W.

HESPERIDES, *hes per'i deez,* in Greek legend, Agle, Arethusa, Erytheia and Hesperia, the daughters of Atlas and Hesperis, who guarded the golden apples which Gaea, or Earth, presented to Juno on her marriage to Jupiter. The sleepless dragon, Ladon, assisted the maidens in their guardianship of the sacred fruit. It was the eleventh labor of Hercules to obtain the golden apples (see HERCULES, subhead *The Twelve Labors*). The Hesperides are frequently referred to in the classics; an example is found in Shakespeare's *Pericles:*

> Before thee stands this fair Hesperides
> With golden fruit, but dangerous to be touched,

and Whittier in his *Barefoot Boy* gloats over his boyhood memory in the words:

> Mine, on bending orchard trees,
> Apples of Hesperides!

HESSE, *hes,* GRAND DUCHY OF, a state of the German Empire, known as Hesse-Darmstadt until 1866. It is divided into two main portions: a northern division, consisting of the province of Oberhessen (Upper Hesse), and a southern, formed by the provinces of Starkenburg and Rheinhessen (Rhenish Hesse). Oberhessen occupies the territory between the basins of the Weser and the Rhine Rivers; Starkenburg lies between the Main and the Rhine, and the latter river separates Rheinhessen from Starkenburg. The total area of Hesse is 2,965 square miles, which is a little in excess of the area of Delaware.

The inhabitants of the grand duchy are engaged chiefly in agriculture and mining. More than three-fifths of the available land is cultivated; nearly 40,000 acres are planted to grapes and about 7,500 acres to sugar beets. Among the grain crops, rye and barley take the leading place. Iron, manganese, salt and coal constitute the mineral wealth of the duchy. The principal towns are Darmstadt, the capital, Offenbach, Mainz, Worms and Giessen. Education is everywhere compulsory, and there are excellent secondary schools and colleges.

The name of this grand duchy has figured in European history since the beginning of the Christian Era, and has been applied to a

LOCATION OF HESSE

country of varying boundaries. The present grand duchy was known as Hesse-Darmstadt until the time of the Seven Weeks' War (1866) between Austria and Prussia, when it was reduced to its present limits; in 1871, at the close of the Franco-German War, it was incorporated with the new German Empire. Population, 1910, 1,282,000.

HESSIAN, *hesh'an,* FLY, a frail, two-winged insect whose young (larvae) are very destructive to wheat crops. When flying, it is a harmless, tiny speck in the air, but as a magot, in the base or the stalk of wheat, it causes the destruction of about ten per cent of the wheat crop of the United States and Canada alone. This means a loss of over 40,000,000 bushels of wheat a year, enough to make 3,528,000,000 loaves of bread—sufficient to furnish one loaf a day for 147 days to every inhabitant of a city of 2,000,000 people. In addition to this destruction, it also does considerable damage to barley and rye.

HESSIAN FLY

This pest received its name from an unfounded belief that it was introduced into America in the bedding-straw of Hessian troops employed to fight against the Americans during the War of Independence (see HES-

SIANS). The parent fly is about an eighth of an inch long, with a wing expanse of about a quarter of an inch. With its dark-brown body and dusky-gray wings, it looks very much like a mosquito. There are two principal broods annually. The eggs for one are laid during April or May, and for the other during September. Each female lays from 100 to 150 tiny pale-red eggs. They are deposited in rows of three or more on the upper part of the leaf or on the lower joints of the wheat stalk. In about five days whitish maggots hatch from the eggs and embed themselves between the leaf-sheath and stem of the grain. They then commence to suck the juices from the stem, and their presence can be told by an enlargement of the plant at those points (see GALLS). Within a few weeks the young (larvae) change into forms which look like flaxseed. They remain in that state until they are ready to emerge as full-fledged flies. The eggs laid in the spring develop into the adult flies of September; those laid in fall produce the full-grown flies of April and May.

It is impossible entirely to save a crop which has become badly infested with Hessian flies. Plentiful and prompt use of fertilizers will cause the wheat to send out new shoots and so a better yield will be obtained. By planting winter wheat late enough not to be attacked by the fly and early enough not to be affected by weather conditions, the crop is practically assured. The exact date of planting will vary with the locality from about September 15 to October 15. Planting a small strip of wheat early enough in spring for the flies to lay their eggs in it, then plowing it under, will insure the safety of the actual crop planted later. M.S.

Consult Lugger's *Hessian Fly*, published by the Minnesota Agricultural Experiment Station; Webster's *Hessian Fly*, procurable from the United States Department of Agriculture.

HESSIANS, *hesh'anz,* the name given to the German soldiers who were hired by the British to fight against the American colonies during the Revolutionary War. As more than half of them came from two Hessian provinces, the term was applied to the whole body of mercenaries, about 29,800, who had been sold into a war in which they had no interest. The men who were thus shipped to America were victims of a system which allowed European princes to sell their subjects into military service. The men were paid the usual soldiers' wages, about twenty-five cents a day, the princes meanwhile pocketing a substantial bonus from the British government. Many of the Hessians settled in America after the war and became industrious and loyal citizens.

HEW'ITT, ABRAM STEVENS (1822-1903), an American manufacturer and politician, through whose generosity Cooper Institute in New York City is largely maintained, was born at Haverstraw, N. Y. In 1842 he was graduated with honor at Columbia College, New York City, and a year later began the study of law. On account of failing eyesight he gave up the profession and engaged in the manufacture of iron with Edward Cooper, a classmate, and son of Peter Cooper, the founder of Cooper Institute, the maintenance of the institute being largely due to his efforts as he acted in the capacity of trustee and secretary for many years.

He introduced the open-hearth process of making steel in America. In 1847 he was nominated for Congress by Tammany Hall (which see); was elected and served from that time until 1886, with the exception of one term. He was elected Mayor of New York in 1886 after a campaign in which Henry George and Theodore Roosevelt were defeated. After his retirement from office he gave attention to private business affairs, but kept closely identified with municipal movements and reforms. In 1901 he was elected chairman of the trustees at the organization of the Carnegie Institution. See COOPER, PETER.

HEW'LETT, MAURICE HENRY (1861-), an English novelist, born in London, who achieved fame by his brilliant and faithful interpretations of the historical strife and romance of the Middle Ages. He was educated at London International College, and was admitted to the bar in 1891. Besides *Forest Lovers,* his first popular success, his novels on medieval themes include *Richard Yea-and-Nay, New Canterbury Tales, Little Novels of Italy, Pan and the Young Shepherd, Fond Adventures* and *The Queen's Quair.* Among his novels of modern life, which indicate their author's socialistic views, are *The Half-Way House, Open Country,* and *Rest Harrow.* Mr. Hewlett's style is in complete harmony with the period of his historical romances, so much so that at times it is difficult to gain his thought.

HEYSE, *hi'ze,* PAUL JOHANN (1830-1914), a German novelist, dramatist and poet. He was acknowledged a master of the novelette, of which he published more than a score of col-

lections under various titles, the best known of which is *L'Arrabbiata,* counted among the most perfect short stories ever written. His poetic works include narrative poems, among which is *Urica;* and epics, the most notable of which are *The Bride of Cypern* and *Thekla.* He wrote many dramas as well as novels, but they were less successful. His novels, *The Children of the World, In Paradise* and *Merlin,* although somewhat pessimistic, met with generous recognition. Heyse was awarded the Nobel prize in literature in 1910 (see NOBEL PRIZES).

HEZ'EKIAH (752-698 B. C.), the good king of Judah who began his reign at the age of twenty-five by suppressing all idolatrous worship which had existed under the rule of his wicked father Ahaz. After celebrating the feast of the Passover, to which he invited the ten tribes of Israel, he gained a victory over the Philistines and became great and prosperous. In the sixth year of Hezekiah's reign the king of Assyria carried most of the people of Israel into captivity, but it was not until eight years later that he made an assault on the kingdom of Judah. At first Hezekiah offered him tribute, but when these demands became too great, they were refused. Then Sennacherib, the king of Assyria, advanced against Jerusalem, but God interfered by sending a plague into the Assyrian army, which killed about 185,000 in one night (*II Kings* XIX, 35).

In his famous poem, *The Destruction of Sennacherib,* Byron describes how—

> The Assyrian came down like the wolf on the fold,
> And his cohorts were gleaming in purple and gold,

and tells in ringing verse of the catastrophe:

> And the might of the Gentile, unsmote by the sword,
> Hath melted like snow in the glance of the Lord!

After that Hezekiah's reign was one of great prosperity for his nation, but he was warned by Isaiah of its future capture by the Babylonians.

HIAWATHA, *hi a wah'tha,* sometimes pronounced *he'a wah tha,* is the hero of Longfellow's famous Indian epic, *The Song of Hiawatha.* Several of the North American Indian tribes had their legends of some such warrior, supernatural in his birth and in his strength, who had been sent to open up their rivers, show them the way through the forests, teach them many of the arts of peace, and above all things, plant for them the maize, or Indian corn. These legends Longfellow collected and wove into a poem which still appeals not only to children but to all who—

> Love the sunshine of the meadow,
> Love the shadow of the forest,
> Love the wind among the branches,
> And the rain-shower and the snowstorm.

Of Hiawatha's birth and childhood; of his contest with the West-Wind, his father; of his fasting, his fishing, his wedding, his planting of the corn, his grief at the death of his friends and of his wife Minnehaha, and finally of his departure into "the land of the Hereafter"—all these and more the epic treats in the unrhymed verse which suits so well the subject. There is about the poem enough of an air of realism to make it interesting, yet the atmosphere of mystery, of something more than human, is felt throughout it.

An excellent book for children is Holbrook's *Hiawatha Primer.*

HIBBEN, *hib'en,* JOHN GRIER (1861-), an American educator, university president and logician, born at Peoria, Ill., and educated at Princeton University, Princeton Theological Seminary and the University of Berlin. In 1887 he was ordained to the ministry of the Presbyterian Church, and for four years was pastor at Chambersburg, Pa. He became instructor in logic and psychology at Princeton in 1891, was later promoted to a professorship, and in January, 1912, was chosen president of the institution to succeed Woodrow Wilson, who had resigned to become governor of New Jersey.

His works, which have given him high rank among writers on philosophical subjects, include *Inductive Logic, The Problems of Philosophy, Deductive Logic, The Philosophy of the Enlightenment* and a volume of essays entitled *A Defense of Prejudice.* He is also the editor of the series known as "Epochs of Philosophy."

HIBBING, *hib'ing,* MINN., an important coal-mining town in Saint Louis County, in the northeastern part of the state. It is on the Great Northern and the Duluth, Missabe & Northern railroads, twenty-five miles west of Virginia and eighty miles northwest of Duluth. Hibbing and Virginia are connected by an electric line. The area of the city is nearly two and a half square miles. The population, nearly fifty per cent foreign, including many Austrians, Finns and Italians, was 8,832 in 1910; in 1916, by a Federal estimate, it was 16,412.

Hibbing lies in the productive iron ore region of the Mesaba Range, more than forty mines

being within ten miles of the city. Here are the largest open-pit mines in the world. Lumbering and farming are important industries of the surrounding country. The more prominent buildings are a village hall, erected at a cost of $135,000; a high school, costing $300,000; a Carnegie Library and two private hospitals. In the town are Mesaba and Bennet parks and near by is Sturgeon Lake. Hibbing was settled in 1892 and incorporated in 1893. In 1917 it was still governed under a village charter. J.E.L.

HIBERNATION, *hi ber na' shun.* When icy winds roar through the treetops and snow is piled high on the ground, many animals tuck themselves into out-of-the-way places and fall into a long sleep. That sleep is called *hibernation,* meaning *winter sleep,* from the Latin word *hibernus,* for *winter.* In that state long periods of severe weather or scarcity of food are passed without discomfort to the animal. A similar state of sleeping occurring in summer months is called *estivation.*

As the time approaches for the change, the animal grows fatter and becomes gradually more slow in its habits, until finally it falls into a stupor. Some animals, such as the badger, do not waken until the period of cold or food scarcity is passed. Others, such as the chipmunk and gopher, become active on pleasant days, partake of food which they have stored and then go back to sleep. Each animal seems to be governed by habits which have passed down from generation to generation. When an animal wakens from its hibernation it has lost thirty or forty per cent of its weight, for it has used its stored-up fat during its long sleep, and is weak and inactive, but it quickly regains its natural vigor.

During hibernation animals breathe very slowly and the heart scarcely beats. For that reason a rude awakening sometimes will cause death. The body temperature of a hibernating animal is usually that of its surroundings. A slight increase in the temperature will generally awaken the sleeper. But hunger is probably the call which it answers when once again it is time to become active.

Hibernating animals are chiefly vegetable feeders. Almost all burrowing animals hibernate, and among them the woodchuck is most notable. The length of its winter sleep is regarded by some as a weather prophecy (see GROUNDHOG). Bears, skunks, dormice, squirrels, prairie dogs, badgers and bats also escape the rigors of northern winters by hibernation.

When ice locks up waters, many fish bury themselves in the mud and sleep. Toads, frogs and some reptiles, a few butterflies and many other insects have similar long periods of inactivity. V.L.K.

HIBERNIA, *hi ber' ni a,* the ancient name of Ireland, said to have been applied to it first by Julius Caesar. Frequent reference to it is found in the classics, notably in the writings of Ptolemy, who described the country in detail, under the name *Juverna.*

HIBISCUS, *hi bis' kus,* a tropical and subtropical plant of the mallow family which yields mucilage. The *rose of Sharon* is the most familiar cultivated species. Another more hardy variety, the *swamp rose mallow,* flourishes along the Atlantic coast and near the Great Lakes. This plant is very attractive, with large, velvety leaves and bell-shaped, rose-colored flowers. The unripe fruit of another species is used in the East and West Indies and in the United States for thickening broths and as an article of food; it is also called *okra* or *gumbo,* and is an important factor in the composition of the soup with which most families are familiar. Other Indian varieties, such as the hemp, yield fibers of different qualities. The seeds of still other species, which are said to possess medicinal properties, have a fragrance suggesting musk or amber, and are used in the manufacture of perfumes.

HIBISCUS
The variety known as the swamp rose mallow.

HICCOUGH, or **HICCUP,** *hik' kup,* a sudden, spasmodic intaking of the breath, attended by a peculiar, sharp sound. An attack of hiccough is brought on by a sudden contraction of the diaphragm, and is attended by closure of the glottis, which is the opening from the pharynx into the larynx. The sound is caused by the inrush of air against the closed glottis. Paroxysms sometimes last only a few minutes, but they may endure for several hours or even a number of days; in the latter case death may follow from exhaustion. The most frequent cause of hiccough is some form of indigestion,

though an attack may be brought on by a violent fit of laughter. Hiccough sometimes accompanies pneumonia, peritonitis, appendicitis and typhoid fever, and in these diseases it is regarded as an alarming symptom.

Ordinary attacks of hiccough may be stopped by a long, slow intaking of the breath, after which the breath should be held as long as possible. Frequently a case is relieved by a drink of water. Some persons can stop an attack by running the tongue far out of the mouth and keeping it out for two or three minutes. Ammonia, camphor or musk will be found helpful in relieving more stubborn cases, but if the attack is long continued it may be necessary to administer a general anaesthetic. See DIAPHRAGM. J.H.K.

HICHENS, *hitch'enz,* ROBERT SMYTHE (1864-), an English novelist whose best-known story, *The Garden of Allah,* was converted into an elaborate play which met with considerable success. Another story, *Bella Donna,* was dramatized for Madame Nazimova. Hichens was born at Speldhurst in Kent, and was educated at Clifton College, the Royal College of Music and the London School of Journalism. Among his novels, besides those mentioned, are *Green Carnation, Flames, Felix, The Dweller on the Threshold* and *The Way of Ambition.* He also assisted in writing the play *Becky Sharp,* in which Mrs. Fiske was starred. In 1914 his *Spell of the Holy Land* was published.

HICKORY, *hik'er i,* the name given to several species of trees found only in North America, and until recently regarded as belonging to the same family as the walnut. The hickories are trees of beauty, and their timber is highly valued, for they grow to a height of seventy to ninety feet, and the wood is very heavy, strong and elastic. It is extensively used in the manufacture of cask hoops, ax handles, chair backs, axletrees, carriage shafts, handles of golf clubs and other implements where great strength and elasticity are required. The chief disadvantages of the timber are its rapid decay, caused by exposure, and its liability to destruction by worms. Hickory is highly esteemed as fuel, because it develops more heat than most other woods, and also for the high quality of charcoal which can be made from it. Bacon and ham cured by hickory smoke are said to possess finer flavor than any other smoke can give.

In forests, hickory trees grow to a height of fifty or sixty feet before branches appear, but in open spaces they may grow widely-spreading limbs. The fruit is a hard-shelled nut, grown in a husk which divides into four parts. The nuts of some species have a very delicate

HICKORY

The form of the tree, as seen in winter; the appearance of leaves; the nut in its case and out, and a cross section of it.

flavor, while others are quite bitter. The edible nuts provided by the species known as white hickory are greatly appreciated in America and are exported in large quantities.

HIERARCHY, *hi'er ahr ki,* from the Greek words, *hieros,* meaning *sacred,* and *arche,* which means *government,* is a term used by religious writers to describe the whole governing and ministering body of the Church. The word, in its strict sense, can be applied only to those Churches which are governed by prelates, such as the Roman Catholic and Anglican churches. The term has two divisions, order and jurisdiction. The first embraces all the various classes of ministers who direct public worship, administer the sacraments and perform the other duties of their calling, whether established by divine or by religious authority. The hierarchy of jurisdiction deals directly with the government of the Church and, beginning with the Pope, comprises all degrees of religious authority.

HIEROGLYPHICS, *hi er o glif'iks,* or **HIEROGLYPHS,** from Greek words meaning *sacred* and *carve.* It was applied by the Greeks to the symbols carved by the Egyptians on their monuments, and in more modern times is generally used to describe any form of picture-writing, particularly that of the Aztecs and the early American Indians. The hieroglyphics of the Egyptians, called sacred because the

Greeks fancied that they dealt only with religious topics and were understood only by the priests, have claimed the attention of scholars for centuries, and still present some extremely interesting problems.

Pure picture-writing is a very simple and primitive matter. If the savage wishes to represent a man, a bird or an arrow, he simply draws rude pictures of those objects; and these may be understood by anyone, irrespective of his language. Thus, an Eskimo could "read" the picture-writing of an Aztec as well as he could that of his neighbor. But pure picture-writing serves but few purposes, while it inevitably suggests the need for a more practical system of representing ideas. Thus the *ideographic writing,* or ideograms, as the picture-writing is called, gives place to symbols which represent sounds, either alphabetic or syllabic; and when the latter have completely superseded the former, writing in its modern sense has been achieved.

The Egyptian Symbols. Presumably the Egyptian hieroglyphics were originally pure picture-writing, but the gap between that and the combination of ideograms with phonetic symbols must be bridged by the imagination, for the very earliest inscriptions extant, which date perhaps from 5000 B.C., contain both forms. Some of the symbols yield their meaning at the first glance; a man, a woman, are easily distinguished; so is a child, when it becomes evident that the figure is engaged in *sucking its thumb.* But general nouns, such as *mankind,* must be represented, and this is done by drawing both a man and a woman. Abstract ideas called for more ingenuity, but even here most of the signs are very clear, if the system is understood. Thus a man in the attitude of prayer means not just "a man praying," but *worship;* a pair of legs represented *walking;* an outstretched arm with a stick, *strength.* Side by side with these there existed the phonetic symbols, probably developed originally by taking short words containing one dominant consonant sound to represent that consonant.

But the complications of Egyptian hieroglyphic writing did not cease even there. So long as the only writing to be done consisted of carefully carved inscriptions on obelisks or tombs, it was possible to preserve the original pictorial form of the symbols, whether these were ideographic or phonetic. But when written language came into more common use for literary and commercial purposes, the picture-writing was too cumbersome. Gradually from the hieroglyphs, therefore, there was evolved the so-called hieratic, or priestly, writing, in which the earliest Egyptian books have been preserved. This hieratic writing shows but faint traces of its original pictorial character, and even these were lost in the *demotic* form, which developed between the eighth and the fourth centuries B.C. The name, which means *common* or *popular,* in which we may trace the English word *democratic,* was given it by the Greeks because when they first came into close contact with the Egyptians this latest form of writing was employed for everything except religious literature. With the introduction of Christianity into Egypt the use of the old writing forms declined, and no inscriptions are to be found in any of the three styles after the middle of the fifth century B.C.

Throughout the Middle Ages and well into modern times no interest was felt in these old hieroglyphics, but from the seventeenth century scholars made occasional efforts to decipher the inscriptions. The problem seemed insoluble, however, until discovery of the famous Rosetta Stone threw light upon it. This stone, found in 1799 by an officer in Napoleon's army, contains an inscription, relative to the coronation of Ptolemy V, in three forms—in Greek, in the late Egyptian demotic, and in hieroglyphs, the Greek version closing with the statement that it was a translation of the two preceding inscriptions. The hieroglyphic text was badly mutilated, but at length a French scholar, François Champollion, hit upon the proper clue and discovered the phonetic value of many of the signs. Later discoveries confirmed the theories of Champollion, and an immense literature on the subject of hieroglyphics has resulted from the more recent studies of scholars. There now exist dictionaries and grammars of the language of the hieroglyphs, but the subject is by no means a closed one to-day.

An interesting fact about the hieroglyphs concerns the direction of the writing. This was not, as in most writings, fixed, but depended on the whim of the writer or the shape of the material to be inscribed. Sometimes hieroglyphics were to be read from right to left, less commonly from left to right; while frequently they were to be read vertically downward.

The Cuneiform inscriptions and also the writing of the Chinese developed from an original pictorial form, and in some of the letters which make up the alphabets of European peoples the primitive ideograms may be traced (see ALPHABET and the various letters, A, B, C, etc.).

Much attention has been given to the Aztec hieroglyphic relics, but the destruction of these by the Spanish conquerors, Cortez and others, was so sweeping that all attempts at systematic decipherment have been in vain. It appears evident, however, that the Mexican system was less perfect than the Egyptian. See CUNEIFORM INSCRIPTIONS. A.MC C.

Consult Erman's *Life in Ancient Egypt.*

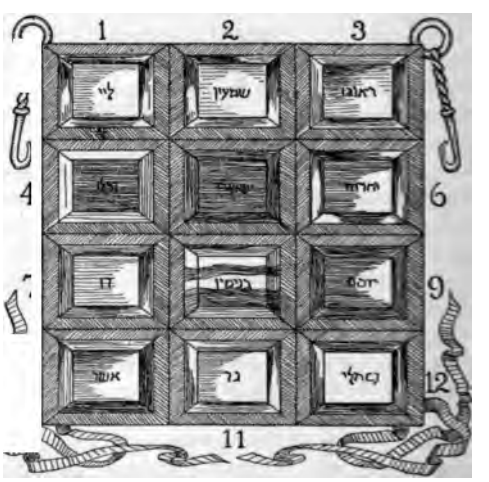
HIGGINSON, *hig'in son,* THOMAS WENTWORTH (1823-1911), an American essayist, active in antislavery agitation before the War of Secession and an earnest advocate of woman's suffrage during the greater part of his life. He was born at Cambridge, Mass. After graduating from Harvard he studied for the ministry, but his antislavery views forced his resignation. He plunged into the free-state struggle in Kansas, and joined in rash schemes to liberate John Brown. In the War of Secession he was made colonel of the first regiment of freed slaves mustered into the national service. He afterwards devoted himself to literature; his best-known books, besides two histories of the United States, were *Out-door Papers, Army Life in a Black Regiment, Common Sense about Woman, On Writing and Speech-Making* and a memoir of Longfellow, whose friend he was for many years.

HIGH POINT, N. C., a city in Guilford County, situated near the west-central part of the state, is seventy-eight miles northeast of Charlotte, and is on the Southern and the Carolina & Yadkin River railroads. Furniture and wood-working mills, car shops and manufactories of furniture, buggies, safes, cotton, silk, hosiery and tobacco are leading industrial establishments. High Point was settled in 1840, was incorporated in 1858, and has adopted the commission form of government. The area is four square miles. In 1910 the population was 9,529; in 1916 it was 12,896 by Federal estimate.

HIGH PRIEST, the head of the Jewish priesthood, whose duties were the oversight of the sanctuary and all that belonged to the sacred service. On the Day of Atonement he alone was permitted to enter the Holy of Holies in the Temple. Besides these especial duties, he presided over the Sanhedrin when religious questions were being discussed, offered sacrifices on special days and was qualified to discharge any priestly function. He was always shown the highest honor.

A high priest could not assume the office until he was twenty years of age, and his conduct was governed by special laws (*Lev.* XXI, 1-15). His official garments were rich, comprising a blue robe partially covered with an embroidered vestment, called an *ephod,* a cap and a square breastplate made of gold, set with four rows of precious stones, three in a row. This costume was laid aside on the Day of Atonement, for he wore pure white linen to enter the Holy of Holies. Aaron was the first to be appointed to this office after the establishment of the Covenant at Sinai, and for a long time the office was for life, but Herod and the Romans grew jealous of the priestly power, so they appointed high priests whenever they wished and deposed them at their pleasure.

JEWISH HIGH PRIEST



HIGH PRIEST'S BREASTPLATE

The illustration is that of the breastplate of the second Temple, as distinguished from the Mosaic breastplate. The precious stones were arranged as follows:

(1) Emerald
(2) Chrysolite
(3) Carnelian
(4) Onyx
(5) Lapis lazula
(6) Ruby
(7) Amethyst
(8) Banded agate
(9) Sapphire
(10) Jasper
(11) Beryl
(12) Topaz

HIGH RIVER, a town in the Macleod district, Alberta, on the Calgary-Lethbridge branch of the Canadian Pacific Railway, forty miles south of Calgary and sixty-eight miles north of Macleod. The Highwood River, a tributary of the Bow, flows through the town. High River is the center of a mixed farming district, and the neighborhood also has deposits of coal, clay and gravel. Oil has been struck about fifteen miles northwest of the town, but the permanent importance of the wells is uncertain. There are lumber yards, a lumber mill and a creamery in the town, but the chief industry is the storing and shipping of grain. Like most of the towns in this section High River has had a rapid growth, its population increasing from 150 in 1901 to 1,182 in 1911 and to 1,400 (estimated) in 1916.

HIGH SEAS, a term applied to all parts of the oceans and open seas more than three miles from land. It does not refer to bays, harbors or landlocked waters. Within the three-mile limit the control of the sea belongs to the nation whose coast the sea washes. Beyond the three-mile limit the sea becomes an international area, accessible, by agreement of all nations, on equal terms to all. Vessels of a friendly power may be searched while within the three-mile limit if arousing suspicion in any way, or if necessary they may be pursued and searched beyond those limits. In time of war belligerent nations exercise the right of search on the high seas in connection with neutral vessels suspected of violating neutrality laws. Such vessels may also be captured if found running a blockade maintained by a power at war. Such was the world-wide understanding before the War of the Nations, which began in 1914. In that struggle Germany assumed the right to destroy without warning any vessel, either neutral or belligerent, which entered a wide prohibited area of the high seas around Western and Southern Europe. See NEUTRALITY; SEARCH, RIGHT OF; INTERNATIONAL LAW.

HIGH'WAY. In early England the main-traveled public roads were the only ones raised above the natural level of the countryside, and people naturally referred to such a road in any neighborhood as the "heigh rode" or the "heigh weye," and to its continuation into a town as the "heigh strete." *High Street* is still a common name in English and Canadian cities, and *highway* is now made a popular title of roads nearly everywhere. In law, highway designates any public road. See ROADS AND STREETS; LINCOLN HIGHWAY; DIXIE HIGHWAY.

HILL, an elevation of land rising not more than 2,000 feet above the surrounding country formed in three ways: by glaciers, which on melting leaves stones and sand; by volcanic action; or by the gradual wearing away of plateaus by rain (see EROSION). They present a pleasing aspect in any generally level country, and when many are closely grouped they may become notable for their scenic beauty. The Berkshire Hills in Massachusetts are covered with trees and carpets of grass, and are so beautiful in effect that many people admire them as much as their lofty big brothers, the mountains. Some hills which are a great deal higher than the land around them are called mountains, although incorrectly so; those near the base of a mountain range are called *foothills.* See MOUNTAIN; MORAINE.

HILL, DAVID BENNETT (1843-1910), an American lawyer and public official, former governor of New York and a United States Senator. He was born in Havana, N. Y., where his father was a carpenter in poor circumstances. In 1864 he was admitted to the bar and speedily built up a large practice in Elmira. He was elected to the Assembly in 1871, took an active part in reform legislation, and assisted Tilden in fighting Tammany Hall. In 1882 he was elected mayor of Elmira, and became lieutenant-governor of New York the same year. Upon Cleveland's resignation as governor in 1885 to assume the duties of President of the United States, he became governor; in 1886 was elected to the office and served until 1892. During his second administration the death penalty was changed in New York state from hanging to electrocution, largely through his efforts.

In 1892 he was elected to the United States Senate, where he vigorously opposed many measures approved by President Cleveland. He was a prominent candidate for the Presidency in 1892, and two years later was defeated by Levi P. Morton for another term as governor. After the expiration of his Senatorial term in 1897 he practiced law in Albany, and at his death had become one of the ablest lawyers in the state.

HILL, DAVID JAYNE (1850-), an American educator and diplomat, was born in Plainfield, N. J. He was educated at Bucknell University, and from 1879 to 1888 was the president of that institution, resigning in order to accept the presidency of the University of Rochester, where he remained eight years. After spending three years in the study of law in

Europe, he became professor of diplomacy in a law school in Washington, D. C. From 1898 to 1903 he was an assistant Secretary of State of the United States. He was then in turn minister to Switzerland and to the Netherlands, and was ambassador to Germany from 1908 till 1911. He is a member of various learned societies and author of *Life of Washington Irving, Science of Rhetoric, The Life and Work of Hugo Grotius, A History of Diplomacy in the International Development of Europe* and *International Justice.*

HILL, JAMES JEROME (1838-1916), the man whose foresight and energy made him the foremost leader in developing the great "Northwest" of the United States and Canada, was born on a farm near Guelph, Ont., and educated at the Rockwood, Ont., academy. The death of his father when James was a mere lad necessitated his leaving school, and for a time he worked in a local store for four dollars a month. At the age of sixteen he left home and went to Saint Paul, Minn., then a village of about 5,000 inhabitants. Here he secured employment with a steamboat company, and his honesty, industry and business ability led to rapid advancement.

JAMES J. HILL
Master railroad builder of America.

At the age of twenty-five he was agent of the Northwestern Packet Company. Five years later he organized the Red River Transportation Company, which was the first to open communication between Saint Paul and Winnipeg. This was the first of a series of enterprises which culminated in the completion of the Great Northern Railway system, with its line of steamers connecting Puget Sound with the Orient. The next important event in this series was the purchase of the Saint Paul & Pacific Railroad by a syndicate which Mr. Hill organized. The company was reorganized in 1879 as the Saint Paul, Minneapolis & Manitoba Railway Company. To this organization Mr. Hill devoted the remainder of his life. Whatever the official position he held in the company, he was recognized as its controlling genius. The new company built lines of railway across Minnesota into Dakota, and one extending northward as far as Winnipeg. In 1890 these roads became a part of the Great Northern system. The main line of this system, extending from Duluth to Puget Sound, was built between 1888 and 1893, with Mr. Hill as the chief promoter. The Great Northern Steamship Line completed the connection with China and Japan. The Great Northern was the first transcontinental railroad built without government aid.

Mr. Hill was the foremost authority on transportation and was one of the leading financiers of America. His advice was sought in the great financial centers, and he became vice-president of the New York Chamber of Commerce and a member of the board of directors of several of the largest banks. Mr. Hill was a convincing public speaker and a fluent writer. He gave $500,000 to found a theological seminary in Saint Paul, and was known for his simplicity of life and his kindness. W.F.B.

HILLIS, NEWELL DWIGHT (1858-), an American Presbyterian clergyman, author and lecturer, born at Magnolia, Iowa. He was educated at Iowa College and at Lake Forest (Ill.) University, and was graduated from McCormick Theological Seminary, Chicago, in 1887. He entered the ministry in the latter year, his first pastorates being in Peoria and Evanston, Ill. In 1894 he succeeded David Swing as pastor of Central Church in Chicago and in 1899 was called to the Plymouth Congregational Church in Brooklyn, N. Y., which Henry Ward Beecher had made famous. Dr. Hillis is widely known as a lecturer, and is the author of *A Man's Value to Society, How the Inner Light Failed, Prophets of a New Era* and many other works. In 1915 he became seriously involved financially through unfortunate speculations undertaken for himself and friends. This conduct, so unusual in the ministry, he openly confessed to his congregation and began at once to plan restitution, secure in the confidence of his thousands of friends.

HIMALAYA, *hi mah' la ya,* the highest mountain system in the world, situated in Asia. The word is Sanskrit and means the *abode of snow* or the *snowy range.* The name is usually confined to the great rampart of mountains that encircles the northern part of the peninsula of India and separates it from the elevated tableland of Tibet (which see). They sweep in a gigantic arc which has its rounded side turned south, and stretch from the great bend of the Indus on the west to the great bend of the Brahmaputra on the east. These two great rivers

Tibet only a few miles distant from
r, on the northern slopes of these
.
gth of this mountain system is nearly
s, and its breadth is between 100 and
The Himalayas are not formed of
chain of mountains, but consist of
gh parallel ranges, capped by a great
rugged, snowy peaks and intersected
alleys and extensive table-lands. The
this system is situated to the north-
ide the boundaries of India, in the
the Pamir (which see), known locally
oof of the world." The Himalayas
ected with the mountains of Asia
tch east and west. Immediately west
s the Karakoram, or Muztagh chain,
h they are separated by the pass of
name, situated at an altitude of
: above sea level.

Passes, Glaciers. From the plains of India watered by the Ganges, which evation of about 1,000 feet above sea
: Himalayas ascend by successive hey contain the highest peaks in the *ount Everest* (which see) has an alti- ,002 feet, and is the highest point on 's surface. Not far from it rises *nga,* 28,146 feet high, the second ak in the Himalayas. Both of these be seen from the mountain resort of in India. The view reminds one of nc, the highest peak in the Alps, as Chamonix. This does not mean that y of the scenery of the Himalayas with that of the Alps. The variety ts, the richness of color and the sharp which are so characteristic of the Al- scape and constitute its picturesque- acking in many of the gray, barren he Himalayas. But the majesty and eur of these stupendous ranges have ion of their own, which strongly im- ose who see them.

sses which traverse these mountains ; the loftiest in the world, for few of at a lower altitude than 15,000 to 16,-
Numerous glaciers, some of which size the great Alpine glaciers, are many parts of the range.

le and Animal Life. The vegetation ly varied, and on the steep southern is very luxuriant. Tropical plants, he plantain, fig and palm trees, are to a height of 3,000 feet. The forests in an abundant growth of shrubs of all sizes and are adorned with climbing plants in wonderful profusion. Oaks, chestnuts and laurels are common, and are found up to a height of 7,000 feet, while deodar and pines grow up to 12,000 feet elevation. These mountains are famous for their wonderful growths of rhododendron. The tea plant is cultivated up to 5,000 feet on the southern slope; rice, corn and millet, up to 6,000 feet; wheat and barley are found at a slightly higher altitude.

The animal life is also abundant and varied. In fact, the Himalayas form one of the richest zoölogical regions in the world, peopled with species found in the tropical, temperate and cold zones. The tiger, leopard, rhinoceros, elephant and monkey are found here at high altitudes. This region is the home of the yak (which see). No other part of the world is so rich in birds as these forest-clad mountains, for almost all kinds of birds are well represented. For maps, see ASIA. O.B.

HINCKS, *hinks,* SIR FRANCIS (1807-1885), a Canadian journalist, financier and statesman, one of the ablest and most conspicuous of the leaders who fought for responsible government, for many years a member of the Canadian Assembly and later of the House of Commons, several times a member of the Cabinet, and himself Premier from 1851 to 1854. Hincks was born at Cork, Ireland, but he came of an old English family, known in Cheshire since the days of the Tudors. His father and his four elder brothers were Presbyterian ministers, but young Francis preferred a commercial career.

SIR FRANCIS HINCKS

At the end of a five-year mercantile apprenticeship young Hincks was sent to America, where he visited the West Indies and spent the winter in Canada. The advantages to be found in Canada made a strong impression on his mind, and three years later he determined to emigrate. In July, 1832, he married, and a fortnight later sailed with his bride for America.

Hincks was a reformer by nature and was soon in the thick of politics. In 1838 he founded the Toronto *Examiner,* which was for many years, under his direction, the leading Liberal organ in Upper Canada. He was elected

to the Assembly in 1841, and in the following year was appointed inspector-general of finance, a position which he held until 1843. He continued to sit in the Assembly, and from 1848 to 1851 was again inspector-general in the Baldwin-Lafontaine ministry. On the resignation of Baldwin and Lafontaine, Hincks formed a ministry with A. N. Morin as joint Premier. While Premier he conducted the negotiations for the construction of the Grand Trunk Railway, and together with Lord Elgin negotiated the reciprocity treaty of 1854 with the United States (see ELGIN, JAMES BRUCE, EIGHTH EARL OF). His failure to secularize the clergy reserves, however, led to the defeat of the ministry in the same year.

From 1855 to 1861 he was governor of Barbados and the Windward Islands, and then for seven years was governor of British Guiana. In 1869 he was knighted, and returning to Canada, was, until 1873, Minister of Finance in Sir John A. Macdonald's Cabinet. All his life Hincks' reputation suffered from his inability to get a calm view of opinions contrary to his, but his services to Canada, particularly in financial organization, make him one of the foremost figures in Canada's history. G.H.L.

HIN'DENBURG, PAUL VON BENECKENDORFF UND VON (1847-), a German field marshal famous for leadership of his country's armies in the War of the Nations. At the outbreak of the conflict in 1914 he was a retired general, living on a pension. He was not tolerated at headquarters, because he was believed to be a man of one idea, and that an unsound one. During his long career in the army, which commenced just before the war with Austria in 1866, he had for a time been a staff officer in East Prussia and had planned some of the annual military maneuvers there. Later, as a lecturer on applied tactics in the War Academy, he located many of his imaginary battles in the region of the Masurian Lakes, in Northeastern Prussia. For years he had been subjected to good-natured ridicule because he had insisted upon the military importance of that low, marshy land. In this region on August 29, 1914, just a week after the kaiser had recalled him from retirement in the hope that, after all, he might be right in his opinion regarding the Masurian section, he overwhelmingly defeated two Russian armies, whose men he claims outnumbered his own three to one. It is said that he took 120,000 prisoners, enough to have ended any previous war.

VON HINDENBURG
Germany's military hero in the War of the Nations.

Much of his subsequent success is said to be due to his extensive employment of railways for troop movements. Von Hindenburg became the military idol of the German people, and a gigantic wooden statue of him was erected in Berlin in 1915. Emperor William raised him to the highest military rank, that of field marshal, and made him chief of the general staff.

Marshal von Hindenburg was born in Posen, of a family of soldiers. He is genial, but demands strict discipline. His messages to his troops proclaim him a man of deep religious sentiment, firmly believing in the divine mission of his emperor and country. See WAR OF THE NATIONS.

HINDU KUSH, *hin'doo koosh,* a range of mountains in Central Asia, 500 miles in length. It forms a great watershed between the Kabul and the Oxus rivers, and for 200 miles is the southern boundary of Afghanistan. The highest peak is Tirach Mir, a snow-clad giant rising to a height of about 25,000 feet. This range was called the Caucasus by historians of Alexander the Great. It is said that Timur endeavored to cross these mountains and left a record of his attempt engraved in a rock.

HINDUSTAN, or **HINDOSTAN,** *hin doo stahn',* meaning *the land of the Indus,* is a name commonly applied to the whole peninsula of India, but more correctly confined to the valleys of the Jumna and the Ganges rivers. It does not include the Punjab, though the natives of that territory speak the Hindostani language. The name is of Persian origin, and in the Hindostani tongue there are still many Persian words and phrases. See INDIA.

HIPPARCHUS, *hi pahr'kus,* the founder of scientific astronomy. Two great men stand out among all the astronomers of antiquity, Hipparchus and Ptolemy. The former, a Greek, was born in Nicaea, about 160 B.C., a time when the Greeks were colonizing Southwestern Asia. He lived for a time at Rhodes and then went to Alexandria, in Egypt, the great center of learning of that time. There he studied and

remarkably accurate observations of the ens, and on these his fame rests. He pre- l a catalogue of 1,080 fixed stars, classified ding to brightness. Ptolemy later used catalogue and preserved it for future gen- ons.

pparchus also observed and calculated the length of the seasons, the length of the and the motions of the planets and the in their orbits. Not only did he observe ese things, but he was also able to make ds of them for those who should follow. der to do this he had to enter the hitherto own sphere of higher mathematics, so he nated what is now known as trigonometry; lso designed the planisphere, a diagram of eavens with a circular cover, which when ed shows the exact positions of the heav- bodies at different times.

PPOCAMPUS, *hip o kam' pus,* or **SEA SE,** a genus of oddly-formed sea animals, nging to the same family as the pipefish (PIPEFISH). There are about twenty spe- inhabitants of tropical and temperate rs. The name hippocampus, which comes two Greek words meaning *horse* and *sea ter,* was given this animal because of the

THE HIPPOCAMPUS

arity between its head and that of a horse. ppocampus has a protruding snout, promi- eyes and high cranium, and is like a fish in that it lives in the sea and breathes by

Its body, from six to ten inches in h, ends in a long tail which is tightly l inward, and the animal is covered with ies of bony plates which have spiny pro- ns along the places of connection. It s about in an upright position, but is a weak swimmer, and usually is found with the tail clinging tightly to bits of seaweed. As is true of the pipefish, the male hippocampus keeps in a pouch on the under side of its body the eggs laid by the female, and they are taken care of there until hatched.

HIPPOCRATES, *hip ok' ra teez* (460-357 B. C.), the greatest of the old Greek physicians, often called the "Father of Medical Science," was born on the island of Cos, off the coast of Asia Minor. He was believed by the Grecians to be the descendant of a god, and he became a priest-physician. Hippocrates used temples as hospitals, which had a full measure of pure air, water and sunshine; while the patients offered petitions to their heathen gods they were treated for their ailments by Hippocrates and his disciples. One of his discoveries was that certain diseases could be traced by listening to the sounds made in the chest of a person, but this knowledge did not become really useful until 2,000 years later. He bound his students by a solemn promise to behave with honor and never to divulge a sick-room secret. His writings embrace books on epidemics, air and water, and on diet and hygiene. He traveled throughout Greece and died at an advanced age in Thessaly.

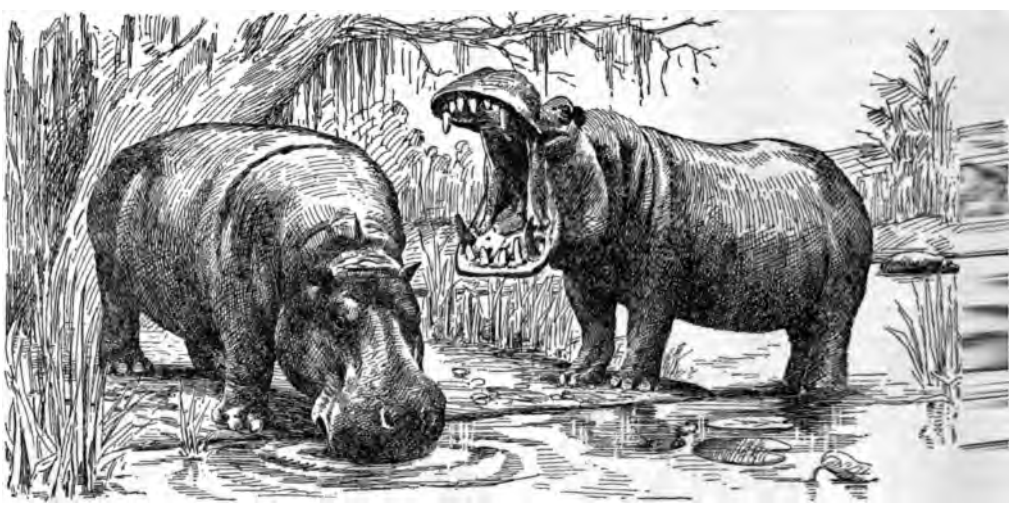
HIPPODROME, *hip' o drohm,* originally a place set apart by the ancient Greeks for horse- and chariot-racing, and later for boxing, wrestling, running, etc. The most famous ancient hippodromes were those of Olympus and Constantinople and the Circus Maximus at Rome. These were of vast proportions, accommodating from 100,000 to 500,000 spectators. The term has also been applied to race tracks in England and France, to the modern indoor circus and, in particular, to two great amusement palaces, in London and in New York. In the latter city the structure occupies an entire block on Sixth Avenue, between 43rd and 44th streets; it was begun on July 1, 1904, and completed in five months. It is the largest playhouse in the world, having a seating capacity of 5,200, and cost $1,750,000. Many interesting and novel features are connected with the stage mechanism. The stage, which will easily accommodate 500 people in a single action, is circular, and while one half is before the audience the other half is being prepared for the scene to follow. An immense tank in front of the stage, a part of the stage accessories, capable of accommodating over twenty rowboats, can be filled with water in five minutes.

HIPPOPOTAMUS, *hip o pot' a mus,* a monstrous, clumsily-built land and water animal of tropical African marshes, swamps and river courses. It is related to the pig family, but its name, from the Greek, means *river horse.* This animal is represented by two living species. One species, the common hippopotamus, often weighing 8,000 pounds, is, next to the elephant, the most bulky of land animals. The other, the rare *pygmy,* or *Liberian,* hippopotamus, is much smaller, weighing but from 400 to 600 pounds. The pygmy also differs slightly from the common hippopotamus in color and habits.

The Common Hippopotamus. This species is a huge, thick-skinned creature with a heavy, barrel-shaped body set on four short, thick legs. Each foot has four toes, which are connected by webs and rest flat on the ground. The head is large, lumpy and ugly, and is so heavy that the animal usually props its chin on some support when out of water. The ears and eyes are small and piglike. Eyes and nostrils are set so high that only a small portion of the animal's face need remain above the water to enable him to see and to breathe, while the rest of the body is safely hidden. The mouth of a hippopotamus is enormous. When opened to its full spread of three or four feet, numerous ivory-covered grinding teeth may be seen. With these strong teeth the creature is especially fitted to cut its food of grasses and grains or to tear up and cut through the stems of water plants.

The skin of the hippopotamus is spongy, rough, thick and naked, except for a few bristles on the muzzle and small bunches of short hair on head, neck, ears and tail. The tail is very short. A remarkable characteristic of the hippopotamus is the red, oily substance known as *blood sweat,* which flows through the pores and covers the skin of the animal when it is excited.

Although clumsy on land, the hippopotamus is an excellent swimmer and diver. It can remain under water a long time, and when it comes to the surface it spouts water from its nostrils like a whale, though the stream is not at all powerful. A male hippopotamus stands nearly four feet high at the shoulder when full grown, and is from twelve to fourteen feet long. The color varies from dark brown to bluish gray. Females are somewhat small and usually of lighter color. One baby hippopotamus is born to a female each year. It is taken to the water immediately, but is carried on the mother's neck until it learns to swim. It takes five years for it to attain its full growth, and thirty or more years is the average life of a hippopotamus.



THE HIPPOPOTAMUS

Hippopotamus flesh and fat are eaten by the natives of Africa. The hides are used for handle covers, whips and other purposes, and the tusks and teeth, which are harder and less liable to turn yellow than the ivory of elephants' tusks, were at one time in demand for the making of artificial teeth. Hippopotamus hunting is a dangerous sport. Small boats are always in danger when nearing an enraged hippopotamus, and even large boats have been attacked. To obtain a specimen for a zoölogical garden, a mother hippopotamus must be

l and brought to land. A baby hippo- n search of its mother is then easily alive, caged and tamed.

Roosevelt and Heller's *Life Histories Game Animals.*

I, *hirsh,* EMIL GUSTAV (1852-), an rabbi, born in Luxemburg. He set- e United States in 1866, was gradu- the University of Pennsylvania and took post-graduate courses in Berlin ig. After serving as rabbi in Balti- Louisville, he took charge of the gregation in Chicago in 1881. Sinai loped under his inspiration a wide ocial settlement activities, conducted r Sinai Center. From 1888 to 1897 esident of the Chicago Public Library nd in 1892 became professor of a the University of Chicago.

I, MAURICE, Baron de (1831-1896), an financier, capitalist and philanthropist descent, was born at Munich. The lth which he inherited from his father ased by marriage and by his banking ad enterprises. His fortune was esti- $200,000,000, and his income at from) to $20,000,000 a year. He and his ted about $115,000,000 to charitable largely for the education and better- the Jews. He established industrial s in Egypt and Turkey, and in 1888 0,000,000 to the Russian government s, provided no race or religious dis- hould govern its distribution. This declined. The Baron de Hirsch n important branch of Jewish philan- ork in the United States.

OGY, *his tol' o ji,* a word derived Greek *histos,* meaning a *tissue* or now applied to the science which the microscopic study of tissues of nd plants. In anatomy, the science of is devoted to the study of the tissues different parts of the body are The elements of which the body is are woven together to complete the the human system much as cotton threads are woven into a textile lthough the science of histology dates seventh century, little real knowledge d until the invention of the micro- de it possible to study the minute of which the tissues are composed. oscope first revealed the presence of d blood vessels in the tissues, and is used in detection of diseases.

HISTORY, a word derived from a Greek word meaning a *search for knowledge.* Like philosophy, history was originally a branch of research; it meant investigation and inquiry, and the historian was a man who sought the truth. As men began to tell what they had learned, the name *historian* took on a new meaning—it meant the man who recorded or told what he had found; and in the course of time "history" became story or record. Unfortunately this meaning is now confused with another, that history comprises the events themselves, not the record of events. Thus when we say that history is being made every day, we think of the events, not of their record.

What events constitute history? Emerson once said that history "may be resolved into the biographies of a few great men." In a very narrow sense this is true, for great men do influence the course of events. Even the greatest of men, however, have been helped or handicapped by circumstances which they could not control. Men are the actors in history, but just as actors on the stage to-day depend on scenery and other stage effects and are limited by them, so the great figures of history have been limited by nature. There was a time when actors used no scenery, just as there was a time when men were regarded as the sole makers of history.

But to-day the complexity of history is recognized. In the broadest sense, history is everything that has happened. As modern science shows that everything is constantly changing, the universe and every part of it have a history. In this sense there is a history of the mountains and seas, of plants and animals, and of all the changing things which make up the universe. The more common use of the term, however, restricts it to those things which are directly related to man's activities. Man is interested chiefly in himself, and history is the record of his achievement.

Divisions of History. In treating history it has become customary to make an arbitrary division into three periods, ancient, medieval and modern. *Ancient history* deals with two great groups, the eastern and western civilizations; the East included Egypt, Chaldea, Assyria, Babylonia, the Hebrews and Phoenicians, Persia and China; the West comprised Greece, Carthage and Rome. Although a few historians place the end of ancient history in A. D. 814, at the death of Charlemagne, most of them accept the fall of Rome in A. D. 476. The *medieval period* included approximately

1,000 years, and came to an end with the fall of the Byzantine Empire in 1453. The invention of printing and the discovery of America are also sometimes considered as the beginning of the *modern era*. It is clear that history is continuous, and its division into three periods is merely a convenience. Events of striking importance, such as the fall of an empire or the discovery of the New World, are the signposts at the crossroads; they point the way on which the world has traveled.

History as a Record. The science of history differs from other sciences, such as mathematics and physics, in that the laws governing the making of history are not fixed and determinable. History deals with all the infinite and variable influences that affect human life; so history must be classed with sociology, politics and economics, as an inexact science. Students and compilers of history must depend upon certain materials or data for their information, and from those data must weave the fabric of recorded history. Guides to historical records are found in remains such as buildings, implements and ruins, also in written records of laws and documents relating to government, in art and literature, contemporary narratives and traditions. From fact, or, sometimes, even theories evolved from facts, the historian endeavors to present a narrative of events in the existence of the nation whose history he is studying.

Viewed thus as research, history is a science, but viewed as a branch of literature it is an art. The scientific historian defends no theory; he seeks to lay bare the truth. The historian as an artist looks upon his subject as a great picture, whose details must sometimes be subdued in order to make an harmonious whole. Macaulay, for example, occasionally lays himself open to the charge of inaccuracy and prejudice, because he sacrifices truth to rhetoric. From the very first there have been these two schools of historians, the scientific and the rhetorical. As a science history flourishes in a scientific age; as an art it rises and falls with the arts. Those periods which have been influenced by masters of style have been little interested in research. The histories written by Englishmen in the nineteenth century illustrate this point. The first years of the century were characterized by romanticism, with its exaggeration of the individual. Macaulay's *History of England*, Carlyle's *French Revolution* and *Frederick the Great* are consistent with such an attitude; "hero worship" belongs to the age of Scott, Byron and Keats. The later years of the century were an age of science, of men like Darwin, Spencer, Buckle and Richard Green. The histories of Macaulay and Carlyle rank as literary masterpieces, but as a record and interpretation they have long been superseded.

It is almost invariably true that historians deal with subjects which interested the age in which they were written. Modern historians began with politics and war; history seemed a continuous march of battles and political intrigue. But as the interest of the people was drawn toward the economic and social factors, these, too, were considered by historians. Histories of industry and commerce are now as common as histories of kings and conquests. W.F.Z.

Consult Harrison's *The Meaning of History;* Lamprecht's *What Is History?* For brief *general* histories, consult works by Myers and Fisher.

Related Subjects. The historical articles in these volumes are numerous and extensive, but as they are listed elsewhere it is not necessary to index the most of them here. Each article on a country, state or province contains a subdivision which treats of the history in general, while in the *Related Subjects* indexes under most of them are listed the specific articles which are of interest in that connection. The following topics have reference to the more general phases of history:

Abdication
Balance of Power
Balkan Wars
Berlin, Congress of
Blood, Avenger of
Charter
Chivalry
Civilization
Colonies and Colonization
Continental System
Coronation
Crusades
Dark Ages
Excavations
Fifteen Decisive Battles
French and Indian Wars
Heraldry
Holy Alliance
Inquisition
Middle Ages
Northwest Passage
Ordeal
Pan-American Congress
Pan-American Union
Peace Conference, International
Powers, The Great
Reformation
Revolution
Rulers of the World
Slavery
Succession Wars
Triple Alliance
Triple Entente
Vienna, Congress of
War of the Nations

The following historians are given special treatment in these volumes:

Acton, Baron
Bancroft, George
Bancroft, Hubert Howe
Bede
Bourinot, Sir John George
Bryce, George
Bryce, James
Buckle, Henry Thomas
Caesar, Caius Julius
Casgrain, Henri Raymond
Doughty, Arthur
Ferrero, Guglielmo
Fiske, John
Froissart, Jean
Froude, James Anthony
Gardiner, Samuel R.
Garneau, François X.
Gaspé, Philippe
Geoffrey of Monmouth
Gibbon, Edward
Green, John Richard
Grote, George
Guizot, F. P. G.
Hallam, Henry

Albert Bushnell	Plutarch
lotus	Polybius
shed	Prescott, William H.
, David	Ranke, Leopold von
hus, Flavius	Renan, Ernest
, William E. H.	Ridpath, John C.
, Henry Cabot	Ross, Alexander
ng, B. J.	Sallust
ulay, Thomas B.	Tacitus, Publius
rthy, Justin	Cornelius
ster, John B.	Taine, Hippolyte A.
let, Jules	Thiers, Louis Adolphe
nsen, Theodor	Thucydides
y, John L.	Thwaites, Reuben Gold
s, Cornelius	Xenophon
man, Francis	

ITTITES, *hit'ites,* descendants of Heth, for centuries occupied the southern part naan, in the neighborhood of Hebron. At riod long before the conquest Abraham l them there, for it was from a Hittite he purchased the cave of Machpelah for mb when his wife Sarah died. From tian and Assyrian sources much has been l concerning the powerful influence of the tes in early history, but after 400 years of gle with the Assyrians, they were con- d by Sargon in 717 B.C. From that time ation existed only in scattered fragments.

VES, *hyvz,* a disease generally caused by estion, appearing on the skin in white, en patches which itch and burn intensely. g such foods as fresh pork, lobster, crab or some acid fruits seem to be a main of hives, although stinging nettles also the patches. Relief from the inflamma- is obtained by taking a laxative, and ng the spots with a solution of baking

The disease is often called *nettle rash,* in Great Britain the term is loosely ap- to croup and laryngitis. J.H.K.

ANG-HO, *hwahng'ho,* or **YELLOW ER,** one of the two greatest rivers of a, as concerns size, although commercially portant. It has earned the name of a's Sorrow," on account of its liability to ent disastrous flooding. The most serious took place in 1887, when an area of r 50,000 square miles was inundated and r a million persons perished. Next to the -tse-kiang, it is the largest river in China, ing a basin with an area of more than 0 square miles. It rises in the marshy ct north of Tibet, flows in a generally n direction until, after a course of 2,600 , it empties into the Gulf of Pe-chi-li, a rm extension of the Yellow Sea.

e river derives its name from the vast nt of yellow earth carried down by its waters. The sediment raises the bed so frequently that the course of the river makes many changes, cutting fresh channels in the soft earth. For centuries dams and dikes have been maintained to lessen the danger of floods. Owing to its rapid current and the deposits of earth the Hoang-ho has little value as a commercial highway.

HOAR, *hohr,* GEORGE FRISBIE (1826-1904), an American lawyer and legislator, deeply-learned and benevolent, and distinguished for having served five six-year terms as United States Senator. He was born at Concord, Mass., was graduated from Harvard in 1846, and soon after beginning his legal career became prominently identified with the Free Soil and Republican parties. In 1852 he was elected to the Massachusetts legislature, and he was a member of the United States House of Representatives from 1869 to 1877, when he was chosen United States Senator by his state. He consistently opposed the acquisition of foreign territory by the United States (see IMPERIALISM), and although he supported President McKinley for reëlection he strongly disapproved of his Philippine policy as being contrary to American ideals. In addition to his public offices, Senator Hoar served as regent of the Smithsonian Institute and as president of the American Historical Association.

HO'BART, prior to 1881 called HOBART TOWN, is the capital of Tasmania, a large island 150 miles south of Australia. The city is beautifully situated on a bay of the Derwent River, twelve miles from its mouth, and is one of the flourishing cities in the Commonwealth of Australia. The surrounding district is chiefly devoted to fruit growing. The harbor is deep and well sheltered, and accommodates the largest vessels. There is regular steamship service between Hobart and New Zealand and Australian ports, and all liners sailing between London and New Zealand make the city a port of call. From Hobart Roald Amundsen sailed due south on his voyage that resulted in the discovery of the South Pole, and from that city the news of his achievement was sent to the world.

The chief industries are sawmilling, iron founding, tanning and the manufacture of woolen goods. On account of its invigorating climate Hobart is a popular resort, and an annual regatta held on the Derwent attracts visitors from all parts of Australia. Population, with suburbs spread out along the banks of the river, 39,937 in 1912.

HOBBEMA, *hob'e mah,* MEINDERT (1638-1709), an artist whose quiet subjects of Dutch cottage and woodland scenery, place him along with Ruysdael at the head of the landscape-painters of Holland. His compositions are subdued in tone and excellent in composition and lighting. The place of his birth and most of his life's story are unknown. He spent most of his time in Amsterdam, where he died in poverty. After his death his works received proper recognition, and many are now among the prized collections in the leading galleries of America and Europe. Over 140 of his paintings are accounted for at the present time, and they bring large prices, some of the smaller landscapes having been sold for $25,000 to $50,000.

HOBBES, *hobz,* JOHN OLIVER. See CRAIGIE, PEARL RICHARDS.

HOBBES, THOMAS (1588-1679), one of the foremost of English moral and political philosophers. He was the first great English writer who dealt with the science of government from the standpoint of tradition rather than reason. His most famous work, the *Leviathan, or the Matter, Form and Power of a Commonwealth,* engaged him in almost perpetual controversies, because of its rationalistic criticism and its uncompromising reduction of religion to a department of state. It was condemned by Parliament in 1666, and "Hobbism" became the popular synonym for irreligion and immorality. Although Hobbes was not again permitted to print anything on subjects relating to human conduct, his political theories have influenced all later politics. A collected edition of his Latin works was brought out in Amsterdam in 1668. At the age of eighty-seven he completed an autobiography in Latin verse and a verse translation of the *Iliad* and the *Odyssey.*

HO'BOKEN, N. J., a city in Hudson County, immediately north of Jersey City, and on the left bank of the Hudson River, opposite New York City, with which it is connected by ferries and tunnels. It is the terminus of the Hamburg-American, North German Lloyd, Holland-American and Scandinavian-American steamship lines, the Wilson and Clyde freight lines, and of the Delaware, Lackawanna & Western Railroad. The Shore Road connects the city with the Central of New Jersey; the Erie; the West Shore; the New York, Ontario & Western; the Pennsylvania; the Lehigh Valley, and the Baltimore & Ohio railroads. An electric trolley service, with connections, extends throughout several counties. About one-third of the population, which was 70,324 in 1910 and 67,611 in 1916, is foreign born, and includes nearly every European nationality, Germans and Italians predominating.

This "mile square city" lies near the foot of the Palisades of the Hudson River (which see). Castle Point, a hill 100 feet high in the northeast part of the city, is the site of Stevens Institute of Technology. In addition to the public school system, the city maintains a teachers' training school; there is also the German Academy and Industrial School.

Among the prominent buildings are the Federal building; the city hall, a fine structure occupying an entire square; the public library, Saint Mary's Hospital, a number of club and bank buildings, the buildings and piers of the Hamburg-American and North German Lloyd Steamship companies, and the Delaware, Lackawanna & Western Railroad terminal. The parks include Hudson Square, Hudson County and Elysian parks.

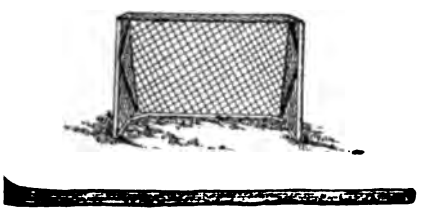
A large per cent of the coal consumed in New York City is shipped through Hoboken. Among nearly a hundred varied industries the most important are manufactures of foundry and machine-shop products, marine engines, motor fire engines, automobile equipment, elevator accessories, furniture, leather, drawing and surveying materials, inks, chemicals, wall paper, silk and buttons.

The site of Hoboken in 1630 was called Hobocan Hackingh (the land of the tobacco pipe), with reference to the pipes carved from native stone by the Indians. Although there were a few previous settlers, the history of the city really began in 1804, when John Stevens, an inventor, bought the land and laid out a town. It was incorporated in 1849 and became a city in 1855. The commission form of government was adopted in 1915.

HOBSON, RICHMOND PEARSON (1870-), an American naval constructor, political leader and advocate of prohibition of the liquor traffic. He became a popular hero in the Spanish-American War. During the blockade of the Spanish fleet in the harbor of Santiago, Lieutenant Hobson, then in service under Admiral Sampson, conceived the plan of "bottling up" Cervera's fleet and preventing its escape. Accordingly, early on the morning of June 3, 1898, he and seven companions sank the collier *Merrimac* in the entrance of the harbor. Fire from the enemy's guns shot away the gear of the stern anchors and the ship was

by the current parallel to the channel
l of across it, but the spectacular daring
attempt captured the imagination of
nerican people, and Lieutenant Hobson
e the hero of the hour.
was born at Greensboro, Ala.; in 1889
aduated from the Naval Academy at
olis, and after taking post-graduate work
s, entered the United States naval serv-
a 1897-1898 he organized and conducted
apolis a post-graduate course for officers
g to enter the construction corps. After
anish-American War he raised and re-
a number of Spanish warships which had
unk off the coasts of Cuba and the
ines. In 1903 he resigned from the navy
r political life, and in 1906 was elected
gress as a representative from Alabama,
until 1915. In 1914 he opposed Oscar
wood in his race for nomination as
States Senator, but was defeated in
imaries after a campaign that attracted
-wide interest. Hobson is well known as
ic speaker and writer, and his services
secured in 1915 for the campaign for
al prohibition. He removed to Evans-
l., in 1916.

KEY, *hock'i,* or **SHINNEY,** *shin'i,* a
played on a level field, each player hav-
curved stick with which he tries to drive
through a goal protected by the opposing
The game is of ancient origin and was



HOCKEY GOAL AND STICK

by the Romans. It is only within
years that a thorough system of rules
en drawn up, for in its modern form
dates from about 1875.
e should be eleven players on each
The ground should be 100 yards long
om fifty to sixty yards wide. The goals
rked at each end of the field with up-
seven feet high and twelve feet apart.
linary baseball or cricket ball is used, but
ld always be painted white. The stick,
a *hockey* or *hookey,* must not be more
two inches in thickness and must not
more than eighteen ounces. A match
is played in two periods of thirty or thirty-five minutes each.

To start the game the ball is placed on the ground in the center of the field, between two players, the other members of the opposing teams being drawn up behind them. Each player strikes the ground and his opponent's stick alternately three times before the ball may be struck. A goal is scored when the ball is driven through the opponents' goal, the side scoring the greatest number of goals being the winner. Hockey is often played by boys without reference to definite rules.

Ice Hockey. This is a more popular game than field hockey in all countries where there is much ice. The players are on skates on a field of ice. In 1881 rules were drawn up by clubs in Montreal, and the game soon became one of the most popular of winter sports in Canada and the northern part of the United States. The ice rink must be at least 112 feet long by fifty-eight feet wide. The sticks are a little larger than those used in field hockey, but must not be more than three inches wide in any part. The game calls for great skill, and only the most expert skaters can excel. The rules of the game vary only slightly from those governing field hockey. There are established amateur hockey leagues in the United States and Canada. This game is played very little in England, as many winters pass without ice available for skating. For full outline of rules, see Spalding's *Hockey.* W.C.

HOE, a tool used by farmers for stirring the soil, covering seeds and killing weeds. The common draw hoe consists of a blade attached to a handle from four and a half to five feet long. The blade is almost at right angles to the handle, and the tool is worked by drawing it towards the workman. The Dutch hoe has the blade so attached to the handle that both are in the same plane. The draw hoe is in general use on small farms and in gardening. On large farms it has been replaced by the horse hoe.

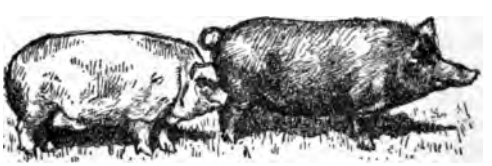
HOE, RICHARD MARCH (1812-1886), an American inventor whose ingenuity made possible the metropolitan daily newspapers of many pages. He was born in New York City, and lived there all his life. In 1846 he invented a rotary printing press, commonly known as *Hoe's Lightning Press.* Later he patented the web perfecting press, which printed both sides of the sheet in one operation, at the rate of 12,000 copies an hour, and included a cutting and folding device. This invention marked an epoch in newspaper printing. It has been

improved until Hoe presses of largest size now print, cut, paste, fold and deliver in neat piles 96,000 16-page papers per hour. See PRINTING PRESS.

HO'FER, ANDREAS (1767-1810), a patriot of the Tyrol, born at Saint Leonhard. In 1796 he led a rifle company against the French at Lake Garda, and after the Peace of Luneville was instrumental in organizing the Tyrol militia. As the leader of the insurrection of 1809, he defeated the French and Bavarian troops and liberated the greater part of his country. He afterwards held important public offices. Following the Treaty of Schönbrunn in 1809, the French and Bavarians again invaded Tyrol; Hofer was betrayed into the hands of his enemies, was conveyed to Mantua, tried by court martial and shot by order of Napoleon.

HOFMANN, *hohf'mahn,* JOSEF (1877-), a Polish pianist and composer, born at Cracow. The lad studied with his father and later with Rubinstein. He started on a public career at the age of six, and began a successful concert tour of Europe when nine years old. Then he visited America, and in two and a half months appeared in fifty-two concerts, which aroused the indignation of the Society for the Prevention of Cruelty to Children, for the boy was breaking down under the strain. He did not again appear in public until 1894, when he played in Dresden; he has since made successful tours of America and the Continent. Hofmann, who composes also for the pianoforte, is classed with a group of pianists who "concern themselves with the orchestral development of piano tone."

HOG, a clumsy, thick-skinned descendant of the wild boar, which under domestication has become a most useful and valuable farm animal. Its flesh is one of the most widely-used foods of mankind, and its fat, hide and bristles



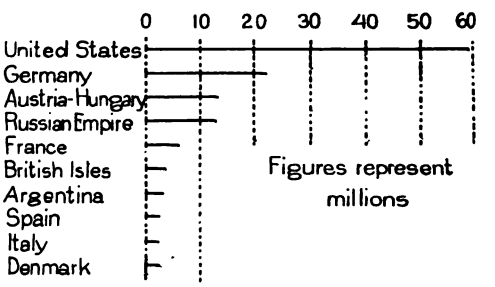
TWO TYPES

At left, Chester white hog, a good lard type. At right, Tamworth boar, a bacon type.

are likewise of commercial value. The hog has a thick neck, which is in a direct line with the trunk and which ends in a head tapering off into a short, pointed snout. Its feet have four horny, separately-hoofed toes, two of which in the domestic animal have atrophied and no longer touch the ground. Usually the hog is dirty white or a dull yellow in color, but brown, black and black-spotted hogs are common. Hogs will eat almost anything, though in the domesticated state their food is chiefly vegetable. As a farm animal raised for food, hogs are found in almost every part of Europe and America, and tame swine have been found by discoverers in previously unexplored territory in the South Seas.

Pigs are born in litters, that is, a number at a time, each litter usually consisting of from four to ten pigs, although as many as fourteen have been reported.

Hogs are unfairly charged with being dirty in their habits. It is true that they do wallow in mud, but all pachyderms, or thick-skinned



COUNTRIES WITH THE MOST SWINE

The table indicates the condition previous to the outbreak of the War of the Nations in 1914.

animals, do this, because only mud or some similar substance is cool enough to penetrate their tough skins. Actually hogs thrive and breed better in clean quarters. The up-to-date farmer is as careful to keep the pigsty clean as to insist on cleanliness in the stable, and to supply his hogs with fresh water and with food somewhat better than the refuse of the farm.

Many varieties of meat are hog products; bacon and hams are possibly the commonest forms, and these are in greatest demand for exportation. Bacon and salt pork, in particular, are staple articles of diet in all military camps, for salt meat keeps for a longer time than the fresh varieties. In spite of the fact that some religions, as the Jewish and Mohammedan, prohibit the use of pork, a great proportion of the world's meat is supplied from the hog industry. On account of the hog's habits of living it is likely to contain disease germs, especially trichina, which when taken into the human system may cause serious maladies. Besides the meat, the thick layer of fat under the skin is tried out and refined for lard; the bristles are used in the manufacture of brushes,

he skin makes a very tough, durable
r. W.F.Z.

ult Day's *Productive Swine Husbandry;* n's *The Hog Book;* Craig's *Diseases of*

GARTH, WILLIAM (1697-1764), the great- glish pictorial satirist, whose powers of ion and combination were extraordinary. culty for presenting the vices and follies time is best seen in his masterpiece, *Mar- á la Mode,* a series of six pictures now e National Gallery in London. Other of paintings along like lines are *The 's Progress* and *A Rake's Progress.* His ry *and Idleness,* the best known of his of engravings, consists of twelve plates. ade many designs of engravings, the most tant of which were *Masquerades* and s and illustrations for Butler's *Hudibras.* as also successful in portraits, the most ar being one of himself and his pug dog p." Many of his works are now pre- l in public and private collections in Eng- Hogarth was born in London, and began reer as a silversmith.

SHEAD, *hogs'hed,* a large barrel or cask olding various substances, its unit of ty varying with the contents. In the l States it is equivalent to sixty-three can gallons, or 52.485 imperial gallons. bacco, its weight varies from 750 pounds 00 pounds in the different states. In 1483 ute enacted by Richard III fixed the ead of wine at sixty-three wine gallons ½ imperial gallons. The London hogs- of ale was forty-eight ale gallons. The *hogshead* probably arose from the fact he head of an ox was branded on the nd the name was rightfully *oxhead,* be- rrupted into the present form. It is now n used as a measure of capacity.

HENSTAUFEN, *ho en shtou' fen,* a ly family which held possession of the an Imperial throne from 1138 to 1254. It ded from Frederick of Buren, who lived second half of the eleventh century, and son, Frederick of Stauffen, built the from which the dynasty derived its name ome remains of which are still to be Beginning with Conrad III, who suc- l Lothair of Saxony, the House of staufen furnished many German rulers, ing Frederick I, Henry VI, Otho IV, rick II and Conradin, the last of the line, execution in 1254 ended the Hohen- n rule. The emperors of this dynasty rank among the ablest rulers of Germany; their fame rests upon their political greatness, their success as organizers and the encouragement they gave to science, art, commerce and trade. See GERMANY, subtitle *History.*

HOHENZOLLERN, *ho en tsohl'ern,* the family name of the royal house of Prussia and of the present king of Prussia and emperor of Germany, in the person of William II. It is derived from the ancestral castle Zollern, or Hohenzollern, in Swabia. The origin of the House is obscure, the story of its supposed descent from one Count Thassilo being legendary. From a petty princely family in the beginning of the twelfth century it developed into a powerful dynasty, and has continued without interruption to the present day to rule over Brandenburg, furnishing Prussia with its kings since 1701, and Germany with its three emperors since the foundation of the empire in 1871. The history of the Hohenzollern family from the fifteenth century is that of Brandenburg, Prussia and Germany. (See each of these titles.)

HOLBEIN, *hohl'bine,* the name of a family of celebrated German painters who lived at Augsburg and Basel from the close of the fifteenth century to the middle of the sixteenth.

Hans Holbein, the Elder (1460-1524), is best known for his *The Basilica of Saint Paul* and a *Passion,* in eleven pieces, now in the Augsburg gallery. Little is known of his life, but he left many works which prove his skill. His style is founded on the models of the early Flemish school, although his later works show traces of Italian influence. Among the best known of the latter are *Life of Saint Paul, Martyrdom of Saint Sebastian* and *Fountain of Life.*

Hans Holbein, the Younger (1497-1543), is seen at his best in a great series of portraits of the most eminent Englishmen of his time. In early youth he was taught by his father. Later he spent much time in Basel, where he devoted himself to religious pictures. To this period belong his famous *Madonna and Child with Saint Ursus and Saint Martin of Tours* and his *Madonna of the Burgomaster Meier.* Here he also designed twenty alphabets of richly-ornamental letters and over 300 woodcuts; his notable series of *The Dance of Death* and the *Old Testament Cuts* were not issued until some time later. In 1526 he went to England, and there was introduced by Erasmus to Sir Thomas More, then in high favor with Henry VIII. This paved the way later to

Holbein's appointment as painter to the king. In this capacity he executed many fine portraits of royal personages, both in England and on the Continent.

HOL'DEN, EDWARD SINGLETON (1846-1914), an American astronomer, who as director of Lick Observatory has rendered important service to astronomical science. He was born at Saint Louis, Mo., was graduated from Washington University in that city in 1866 and from the United States Military Academy in 1870. Holden was professor of mathematics at the Naval Academy from 1873 to 1881, and director of the Washburn Observatory at Madison, Wis., from 1881 to 1885. From the latter year to 1887 he was president of the University of California, and from 1888 to 1898 director of the Lick Observatory at San Jose, Cal. From 1901 to the end of his life he was librarian of the United States Military Academy at West Point. His publications include *Index Catalogue of Nebulae, Essays in Astronomy* and *Mountain Observatories.*

HOL'IDAY. The word holiday, which comes from the Anglo-Saxon *halig daeg,* meaning *holy day,* was applied originally to any festal day which was set apart for religious observance. It was intended to commemorate some sacred event or to honor the memory of some sacred person. The term is now applied to any day on which people lay aside ordinary duties and cares. The religious holidays will be found treated in the article FESTIVALS.

In the United States, Sunday is the only day which is recognized in common law as a day set apart for cessation from labor. Congress has at various times designated special holidays, as the Day of Rejoicing after the close of the War of Secession, but the American people have no national holiday which is definitely set apart by a law of Congress. Even July 4 is not a holiday by authority of the United States. The various states, however, appoint certain legal holidays. In nearly all of them New Year's Day (January 1), Washington's Birthday (February 22), Independence Day (July 4), Labor Day (first Monday in September), Thanksgiving Day (usually the last Thursday in November), and Christmas Day (December 25) are designated as legal holidays.

In the North the thirtieth of May is observed as Memorial Day. Most of the Southern states celebrate Confederate Memorial Day on April 26, but May 10 is the date observed by North and South Carolina, and in Louisiana, June 3, Jefferson Davis' birthday, is honored. The birthday of Robert E. Lee, January 19, and that of Davis are legal holidays in several of the states of the South, and February 12 is a holiday in many states, in honor of Lincoln's birthday. Arbor Day, Bird Day and Flag Day are celebrated more particularly as school holidays.

The public holidays set apart by statute in the Dominion of Canada are as follows: Sunday, New Year's Day, Christmas Day, Empire Day (May 24), Dominion Day (July 1) and Labor Day (the first Monday in September). In the province of Quebec certain feast days of the Church are likewise legal holidays.

For other days observed at least as semi-holidays, see special departments under the various months of the year. See also ARBOR DAY; BIRD, subhead *Bird Day,* also special programs, pages 316 and 743.

HOLINSHED, *hol' inz hed,* RAPHAEL, or RALPH (? -1580), an English writer, born at Sulton Downes, Cheshire, and believed to have been educated at Cambridge. He is known only by his *Chronicles of Englande, Scotlande and Irelande,* but these rank high in importance. The first edition of this famous work was published in London in 1577. It is known as the "Shakespeare edition," because it is the one the poet is believed to have used in collecting material for his historical plays. In the preparation of the work Holinshed is said to have been assisted by some of the ablest scholars of the day.

HOLLAND, *hol'and,* the popular name applied to the NETHERLANDS (which see).

HOLLAND, JOHN PHILIP (1842-1914), an Irish-American inventor who first proved that submarine navigation was practicable. Holland was not an engineer or an inventor by profession; he perfected the submarine for a definite purpose, namely, the destruction of England's sea power. Born in Ireland, he spent his boyhood in a riot of absentee landlordism, evictions and disturbances of every kind, and learned to view England with an abiding hatred. He wanted to free Ireland from English rule, and to do this he realized England's power on the seas would first have to be destroyed.

It was in 1862, while he was teaching in a Christian Brothers' school in Cork, Ireland, that the battle between the *Monitor* and the *Merrimac* gave Holland his call to what he conceived to be his duty. The victory of the ironclad ship, he saw, foretold England's dominion on the sea, unless some new weapon

ose her could be found. Working alone little room in the monastery at Cork, he the problem to his own satisfaction, as laughed at for his "crazy notions." r or two later he went to the United where he continued his experiments, at ne time supporting himself by teaching

He himself was not a Fenian (which but he built a submarine which the s paid for and intended to use.

n the Fenian excitement died out and sibility of war between England and the States was ended by the arbitration of *labama* claims, Holland and his sub- dropped from public notice. Not for years, until 1895, did he appear again. t year the United States government sed for bids for a submarine to be built expense, and Holland was given the t. For a large part of the time during the boat was under construction Holland o ill to superintend the work, and it ft to various government officials, who ally changed the plans. When the r, as it was called, was finished, it was lty that Holland, in disgust, refused to the government to keep it, and he re- $95,000 which had been paid him.

98 he built another submarine, the *Hol-* this time without interference; it was fty feet long and carried only one tor- ube, but in every essential feature it n the model on which nearly all subma- ave since been constructed, and the States, Great Britain, France, Germany pan have built their greater submarines lans furnished by Holland. The essen- ature of the Holland type is that the ine dives below the surface, whereas all s types were merely allowed to sink. r years Holland experimented unsuc- ly with aeroplanes. He met serious l reverses, and died in poverty. See INE. W.F.Z.

LAND, JOSIAH GILBERT (1819-1881), an an editor and novelist, who published ly writings under the name of *Timothy b.* Holland was born in Belchertown, was graduated from Berkshire Medical in 1844 and established himself as a an at Springfield, but was unsuccessful ing a practice. Subsequently he became tendent of schools at Vicksburg, Miss.) he was assistant editor of the Spring- *epublican* and after 1851 part owner of urnal. He was one of the founders of *Scribner's Monthly,* which was started in 1870, this periodical becoming the *Century Magazine* in 1881 under another ownership. His *Timothy Titcomb* letters were attractive for their vivacious style and high moral tone. His novels and poems were popular, and included *Sevenoaks, Arthur Bonnicastle, Nicholas Minturn, Garnered Sheaves, Bittersweet* and *Kathrina.*

HOLLAND, MICH., a city of Ottawa County, situated in the southwestern part of the state, at the head of Black Lake, an arm of Lake Michigan, twenty-six miles southwest of Grand Rapids. Steamers make regular trips between Holland and Chicago, and railway transportation is provided by the Pere Marquette and an electric line. The city had a population of 10,490 in 1910, which had increased to 12,185 in 1916, by Federal estimate. It covers an area of nearly three square miles.

Holland is the seat of Hope College and of the Western Theological Seminary, two schools under the direction of the Dutch Reformed Church in America. The city hall, public library, churches and schools are prominent buildings. The city is the center of a favorite summer resort containing Ottawa Beach, Macatawa, Jenison and Waukazoo.

Important manufactures include furniture, plate and mirror glass, pianos, sporting goods, wood-working machinery, leather, shoes, electric and steam launches, and rusks, the latter being typical Dutch cakes. There are flour and planing mills, a sugar-beet factory, a machine shop and a large pickling plant. Grain and fruit are shipped in considerable quantities.

Holland was settled in 1847 by Dutch colonists who had left the Netherlands in quest of religious liberty, and many of the present inhabitants are of Dutch descent. It was incorporated as a city in 1867, being quickly rebuilt in 1871 after a disastrous fire.

HOLLY, *hol'i,* the popular name of a species of evergreen trees and shrubs, chiefly natives of temperate climates, having dark green, shiny and leathery leaves. The name is said to be derived from the use of its branches and berries as church decorations at Christmas time, from which the plant was called the *holy tree.* It has for many years suggested the spirit of Yuletide.

The common holly, the only European species, and found also in some parts of Asia, is used ornamentally in the parks and gardens of Great Britain, where, on suitable soils, it often attains a height of fifty feet. It is also planted for hedges. The flowers of this holly

are white, and appear in May; the fruit is small, round and scarlet, ripens in September and decorates the tree all through the winter. The leaves, berries and roots are said to have medicinal properties. Birdlime is made from the inner bark. The wood is extremely hard, white and fine grained, and is used by cabinet and musical instrument makers, and sometimes for wood engraving.

Be merry all, be merry all,
With holly dress the festive hall;
Prepare the song, the feast, the ball,
To welcome merry Christmas.
—SPENCER: *The Joys of Christmas.*

The American holly is also an evergreen tree, reaches a height of forty-five feet and resembles the European variety, but its leaves are less glossy and its berries less bright. It is found throughout the United States and Southern Canada, and includes about a dozen species, most of which grow in swampy places. The *maté* which is used in South America instead of tea is made from the leaves of a holly tree. See MATÉ.

HOLLYHOCK, *hol'i hock,* a hardy plant of the mallow family which is found in dooryards and gardens. As *hock* is only another name for mallow, the name *hollyhock,* therefore, means a mallow. It was brought originally from the Holy Land; it grows sometimes to a height of six or eight feet, and the stalk is studded with large flowers, which may be either single or double. In color it ranges from scarlet to lavender and white. Formations called fuzz, on the dried seed pod, are really long, slender arms spreading in all directions. It is best to sow the seed in February and not place the plant in the open until April, when it should be transplanted in well-enriched soil.

HOLLYHOCKS

HOLMES, *hohmz,* ELIAS BURTON (1870-), an American traveler widely known for his illustrated lectures, or *Travelogues,* was born and educated in Chicago. When a boy he became interested in photography and devoted much time to making pictures of his early travels in the United States, Mexico and Cuba. At the age of sixteen he made his first European tour. His first lecture, *Through Europe with a Camera,* was given before the Chicago Camera Club in 1890.

Three years later (1893) he made his first professional appearance. His lectures immediately won popularity, and each year he gives courses in the ten largest cities of the United States, presenting new subjects each season. Mr. Holmes devotes six or eight months each year to travel. His lectures have been published in a series of beautifully illustrated volumes under the title, *Burton Holmes Travelogues.*

HOLMES, OLIVER WENDELL (1809-1894). In his *Fable for Critics,* James Russell Lowell wrote in his sharpest, cleverest vein:

There's Holmes, who is matchless among you for wit;
A Leyden jar always full charged, from which flit
The electrical tingles of hit after hit;

and to this day most people think of Holmes with a smile, remembering the glancing humor of his *Autocrat,* and such of his poems as *The Height of the Ridiculous, The Specter Pig* and *The Hot Season.* But Oliver Wendell Holmes was more than a humorist. He was a physician of note in his day, the writer of medical

OLIVER WENDELL HOLMES

treatises which have a permanent value; he was a teacher, so inspiring that he was given the last hour in the college day for his classes, because he alone could enliven the fagged brains; he was a novelist, though not a great one; and above all else he perfected a certain style of literature, which in reality was but printed conversation. To his unusual abilities was joined a manner of rare charm and a genuine kindliness and love for humanity, and it is thus not strange that he should have been one of the most popular men of his day.

Years of Preparation. Holmes was born on August 29, 1809, at Cambridge, Mass., and was the son of a Congregational minister. The family life was pleasant; he was turned loose in a library and allowed to read "*in* books rather than *through* them," and thus he came to young manhood with the idea that the world was a delightful place. After graduating from Harvard in 1829 he began to study law, but soon gave it up for medicine, in which he became more and more deeply interested. Meanwhile, his name was on men's lips all over the country. In 1830 he heard that the famous ship *Constitution* was to be destroyed, and he wrote the stirring *Old Ironsides*—

Ay, tear her shattered ensign down!
Long has it waved on high,
And many an eye has danced to see
That banner in the sky.

The verses were copied and recopied, and so strong was the popular protest which they voiced that the old ship was saved.

In 1833 Holmes went to Europe to pursue his medical studies, and on his return three years later settled down to practice his profession in Boston. He took his work seriously enough, but other people did not, for they had read his humorous verses, and were not going to trust their lives to a "frivolous-minded" young poet. Partly because of this fact, and partly because he could not endure to witness the constant suffering and misery with which the practice of medicine brought him into contact, he gave up his active work in 1838 and became professor of anatomy at Dartmouth. Two years later he married Amelia Lee Jackson, with whom he lived a peculiarly happy life, and for a time resumed his practice in Boston. But in 1847 he resigned this profession once and for all, to become dean and professor of anatomy at Harvard Medical School, a post he held for thirty-five years. "It's not," he wrote when he first discovered the multiplicity of his duties—"it's not a chair which I've been called to occupy; it's a settee."

Years of Achievement. Hand in hand with his wonderful success as a lecturer he developed a growing literary reputation. For a time this was purely local, and no important occasion in Boston, that beloved city which he called

BIRTHPLACE, AT CAMBRIDGE

"the hub of the universe," was complete without his presence and his verses. But, in 1857, there was founded the *Atlantic Monthly,* and it made Holmes famous at home and abroad. For to it he contributed those talks, wise,

witty and philosophical, which make up the *Autocrat of the Breakfast Table* (which see). Holmes' friends knew how brilliant a conversationalist he was—"the best talker in Boston" —and now the world had a chance to discover it, too. *The Professor at the Breakfast Table* and *The Poet at the Breakfast Table* followed, and repeated the first success, though their charm is hardly so great. Three novels, *Elsie Venner, The Guardian Angel* and *A Mortal Antipathy* introduced people to some of those problems of psychology and of heredity which so deeply interested the author.

In 1886 Holmes visited England, where his reception was in the nature of a triumph. People could not pay honor enough to the sprightly little old man whose acquaintance they had made in the delightful *Breakfast-Table* series. After his return home he wrote *Our Hundred Days in Europe* and one more set of autocrat papers, called *Over the Teacups*. Regarding this series, one critic said, "Sunset lights fall upon the tea table, where a poem always waits, tucked into the silver sugar-bowl, but there is no abatement of the old-time mirth and kind sagacity." Death was as kindly to Holmes as life had been, for he died in his chair, without struggle or suffering, on October 8, 1894.

Among Holmes' best poems may be mentioned the widely loved *Chambered Nautilus*, which was his own favorite; the half-humorous, half-pathetic but wholly kindly *Last Leaf;* the much-declaimed *Wonderful One-Hoss Shay*, and the charming *Dorothy Q*. Probably the most quoted lines from all his works are the last of the *Chambered Nautilus:*

Build thee more stately mansions, O my soul,
As the swift seasons roll!
Leave thy low-vaulted past!
Let each new temple, nobler than the last,
Shut thee from heaven with a dome more vast,
Till thou at length art free,
Leaving thine outgrown shell by life's unresting sea! C.W.K.

Consult Higginson's *Old Cambridge;* Crothers' *O. W. Holmes.*

HOLMES, OLIVER WENDELL, Jr. (1841-), an American jurist and Associate Justice of the United States Supreme Court, was the son of Oliver Wendell Holmes, the essayist and poet. He was born in Boston, was graduated from Harvard College in 1861 and from the Harvard Law School in 1886. In the War of Secession he entered the Twentieth Massachusetts Volunteers and served three years, receiving brevets as major and colonel. He was wounded at the battles of Ball's Bluff and at Antietam. After the war he engaged in law practice in Boston, and was editor of the *American Law Review.* In 1882 he became professor of law at Harvard, and in the same year was appointed to the Massachusetts supreme bench. By appointment of President Roosevelt he succeeded Justice Gray in the United States Supreme Court in 1902. His published works include a volume of *Speeches* and *The Common Law,* the latter a compilation of lectures delivered at Lowell Institute. He also edited the twelfth edition of Kent's *Commentaries.* In March, 1917, on the occasion of his seventy-sixth birthday, he was the oldest member of the Supreme Court, and, excepting Chief Justice White, the oldest in point of membership in that court. See SUPREME COURT, for portrait.

HOLY ALLI'ANCE, a league formed in September, 1815, at Paris after the fall of Napoleon, between Alexander I of Russia, Francis II of Austria and Frederick William III of Prussia. The professed purpose of the league was to unite the sovereigns in a holy brotherhood of alliance. It issued a declaration that, in accordance with the precepts of Christ, the principles of charity, justice and peace should be the basis of each sovereign's international relations, and that their great object should be the welfare and happiness of their subjects. The real purpose of the alliance, however, was to resist republican tendencies and to maintain the power and influence of the reigning families. The agreement was signed by all the European rulers, with the exception of the Pope and the king of Great Britain and Ireland. Metternich, the Austrian minister, was its leading spirit; he gradually obtained almost supreme authority and used the Holy Alliance to favor his own policy. After 1848 the Holy Alliance ceased to have any importance.

Related Subjects. The aims and the methods of the Holy Alliance will be more fully understood if the following articles are consulted:

Alexander (Russia)	Frederick William (Prussia)
Austria, subhead *History*	Metternich, Prince
Francis (Holy Roman Empire)	Prussia, subtitle *History*

HOLY FAMILY, the name applied in art to representations of the Virgin Mary, the Infant Jesus and their attendants. The earliest of these is found in the catacomb of Saint Calixtus in Rome. In the sixth century the Byzantine schools favored an arrangement in which

the Child, in the attitude of blessing, is seated in the Virgin's lap. Later, angels were added as attendants. It was quite late in the Middle Ages when other figures were introduced into the composition. These included Saint Anna, the mother of the Virgin, Saint Joseph, the Infant, John the Baptist and Saint Catherine. A German conception shows the Infant playing with the Twelve Apostles as boys. The Madonna and Child was a favorite subject with the Italian painters of the period of the Renaissance. Some of the earliest of these pictures were supposed to have been painted by Saint Luke, and to be endowed with miraculous powers; that is, it was once widely believed that to look upon them with the eye of faith would heal disease. See MADONNA.

HOLY GRAIL, *grale,* in legend, the sacred cup from which Christ drank at the Last Supper with His disciples. Just when the stories that have been woven about the Holy Grail had their beginning no one knows, but they were first put into literary form by three Norman-French writers at the close of the twelfth century. The first important version of the Grail stories in English literature is the work of Sir Thomas Malory, who lived in the fifteenth century. About 400 years later the legend was given poetic treatment by Alfred Tennyson, whose *Holy Grail* is one of the most beautiful poems in his *Idylls of the King.* Tennyson's version has many spiritual elements that are lacking in the older stories. It is essentially as follows:

As Christ hung upon the cross, Joseph of Arimathea, one of His followers, brought the sacred cup and caught within it the blood which dripped from the wounded side of his Master. In the days of persecution which followed, Joseph was driven out of Palestine and found refuge in Glastonbury, in the island of Britain (England). With him he carried the holy cup, which remained on earth for many years to bless mankind and to heal the diseases of those who looked upon it or touched it. Then in an age of evil, the Grail was taken away to heaven, and during many long, weary years its healing powers were lost to the world.

In the days of the good King Arthur, who lived at Camelot with his knights of the Round Table (see ARTHUR, KING), a vision of the Holy Grail was granted to Sir Percivale's sister, a sweet and saintly nun. She told her brother of the wonderful sight, and when he had related the story to his brother knights, each took a vow to seek the vision.

Of the knights, the noblest and purest was Sir Galahad (see GALAHAD, SIR). For him, Sir Percivale's sister cut off her shining hair and braided a strong sword-belt, giving it to him with these words: "Go forth and thou shalt see what I have seen, and break through all, till one crown thee king, far in the spiritual city."

Then Sir Galahad rode away on a snow-white steed to seek the vision of the Holy Grail. After many adventures he appeared one day before Sir Percivale, all clad in shining armor. As the day began to darken, the two knights came to a great marsh which ran out into a mighty sea, and on this rose a bridge of a thousand piers. Then in wonderment Sir Percivale saw his companion leap upon the gleaming bridge, and as he passed along it every span that he crossed sprang into fire.

Long afterward Sir Percivale told a wonderful story of how three times above Sir Galahad's head the "heavens opened and blazed with thunder such as seemed shoutings of all the sons of God," while the sacred cup, wholly unveiled, hung in the sky like a burning jewel. Then, far away where sea and sky seemed to blend, there rose a celestial city, into which the knight and the Holy Grail were drawn:

I saw the spiritual city and all her spires
And gateways in a glory like one pearl—
No larger, though the goal of all the Saints—
Strike from the sea; and from the star there shot
A rose-red sparkle to the city, and there
Dwelt, and I knew it was the Holy Grail,
Which never eyes on earth again shall see.

In the version of Sir Thomas Malory, the Grail is seen by Galahad, Percivale and Bors, who follow it to the Far East. After a vision of the holy vessel is permitted them, Galahad's soul is carried up to heaven by angels. Percivale dies in a hermitage and Bors alone returns to Britain. Still another version is that of the German poet, Wolfram von Eschenbach, whose *Parzival* is one of the finest poems ever written on the legend. On this Richard Wagner based his great music-drama *Parsifal* (which see).

The treatment of the legend in art includes a famous painting of Sir Galahad, by the English artist George F. Watts (which see), and Edwin Austin Abbey's magnificent frieze setting forth the story of the Holy Grail. The latter is one of the glories of the Boston Public Library. B.M.W.

An illustration of Watts' *Sir Galahad* appears in the article GALAHAD. Consult Weston's *Legend of Sir Perceval.*

HOLY LAND, a name applied to PALESTINE (which see).

HOLY LEAGUE, a name applied to several alliances between European princes for defense or for aggressive warfare. The most important was that of 1576 between the Catholic party of France, the Pope and the King of Spain for the purpose of suppressing the Huguenots (which see). This league led to wars which were not ended until Henry of Navarre defeated the Catholic forces at Ivry in 1590. The term *holy* was given to almost any alliance which met with the approval of the Church.

HOLYOKE, *hohl'yohk,* MASS., a city of Hampden County, noted for the size and number of its paper mills, and known locally as *The Paper City.* The population, which increased from 57,730 in 1910 to 65,286 in 1916, by a Federal estimate, is made up of at least twenty nationalities. The city is situated northwest of the geographical center of the state, and on the west bank of the Connecticut River, eight miles north of Springfield. Boston is 107 miles east and New York is 143 miles southwest. Besides the service of the Boston & Maine and the Westfield branch of the New York, New Haven & Hartford, the city has transportation facilities by electric lines in all directions. The area is a little less than twenty-one square miles.

Holyoke is located on the side of a hill in the most beautiful part of the Connecticut Valley and is surrounded by the river on all sides but the west. Some of New England's finest mountain resorts are in the vicinity. Within the course of a mile, the river here has a fall of sixty feet, and the immense possibilities offered by its water power have turned the interests of the city to manufacturing. A granite dam 1,000 feet long and thirty-two feet high affords a capacity of 45,000 horse power. The city is an important center for hydraulic engineering and for testing water wheels. About 17,000 people are employed in the various industries, the annual output amounting to about $75,000,000. Some idea of the extent of the paper industry may be gained from the statement that every twenty-four hours there are produced 2,000,000 envelopes and 500 tons of fine writing paper, this quantity being sufficient to carpet a space covering two square miles. Within the same period are manufactured 100,000 miles of thread, which would wind four times around the globe, 150 miles of cloth, 75,000 cigars, and a great amount of machinery, boilers, pumps, store fixtures, mill trucks, blankets, tablets and pads. The largest blank-book manufacturing establishment in the United States is here.

The city has twenty-one churches, three hospitals and a library built by popular subscription; the Nonotuck Hotel, the College of Music and Saint Vincent's and Holy Family orphanages are among the notable buildings. There are numerous public, parochial, business, classical and night schools, and the law prohibiting minors who are unable to read and write the English language from obtaining employment in any factory or commercial enterprise is rigidly enforced. The high school has a high-grade lecture course. At a short distance from Holyoke are three noted colleges, Amherst, Smith and Mount Holyoke. In the vicinity are Mount Tom (1,215 feet) and Mount Holyoke (955 feet), scenic points of interest; these are ascended by electric railways.

The first settlement of Holyoke was made by Irish families and for a time it was known as Ireland Parish. In 1786 it became a part of West Springfield, in 1850 was incorporated as a separate town, and was chartered as a city in 1873. C.E.C.

HOLYOKE, MOUNT, the western peak of a small mountain ridge, located six miles north of the city of Holyoke, Mass., on the east side of the Connecticut River valley. On its summit, which is 955 feet above sea level, is a hotel built in 1821, where travelers may rest after making the ascent. A carriage road winds up the well-timbered mountain side, and an electric railway also carries passengers up the last 600 feet. From the top the view of the river valley at the foot of the mountain fills all who see it with admiration. A few miles south, in the little town of South Hadley, is located Mount Holyoke College, founded by Mary Lyon in 1837, for the education of women.

HOLY ROMAN EMPIRE. Nothing can give a truer idea of this curious medieval political creation than Voltaire's statement that it was "neither holy, nor Roman, nor an empire;" yet it played a very real part in the history of Europe for centuries. It claimed to be a continuation of the Western Roman Empire, and was founded by Charlemagne, though the title *Roman Empire* was not used until 962, when Otho the Great was crowned by the Pope, and Frederick Barbarossa first made use of the term *Holy.* Theoretically, the emperor at the head of this most Christian state was ruler of

Christian countries of Western Europe, actically he had control only of Italy ıe German states with their depend-

emperor was elected by the German , and when he proved to be a strong ike some of the Hohenstaufens, his title ed real power, but after the thirteenth ' this power gradually declined until

HOLY ROMAN EMPIRE
Its boundaries in the year 1125.

le became little more than an empty The name Holy Roman Empire be- xtinct in 1806, because of the conquest poleon of many of the states, and II gave up the title of Holy Roman ɔr, adopting instead that of emperor of .

W.E.L.

ted Subjects. The important part played Holy Roman Empire in European history evident if the following articles are con-

ıagne	Germany (*History*)
	Henry
nd	Maximilian
	Otho
:k	Sigismund

ROOD PALACE, the ancient residence Scottish kings in Edinburgh. Originally the famous Augustinian abbey of the ood, which was built by King David I on the spot where, according to the ıe was saved from the attack of a stag iraculous cross which caused the animal to flee. The palace was almost totally destroyed by fire in 1650, and was rebuilt between 1671 and 1679 by King Charles II of England. Holyrood is historically interesting as having been the home of Mary, Queen of Scots, and the scene of the murder of Rizzio.

HOLY SPIRIT PLANT, also called Dove Plant, is the name given to a species of orchid found in Central America, especially in the vicinity of Panama. It derives its name from the resemblance of its united stamens and pistils to a dove hovering with outstretched wings similar to that typifying the Holy Ghost in religious pictures. The flower stem is four to six feet high and bears creamy-white, fragrant flowers, the inner part of which is often flecked with crimson. The plant is much used for altar decoration in churches in Central America. See Orchid.

HOLY WATER, water blessed by a priest, which is used in the Greek and Roman Catholic and Episcopal churches in religious rites and ceremonies, to sprinkle the people and objects employed in religious practices. According to *Ezekiel* XXXVI, 25, it is the natural symbol of spiritual purification. "Then will I sprinkle clean water upon you, and ye shall be clean: from all your filthiness, and from all your idols, will I cleanse you." G.W.M.

HOLY WEEK, the week immediately preceding Easter, and consecrated to the commemoration of the final events in the life of Christ. Holy Week in Roman Catholic and Anglican Churches is marked by added solemnity and abstinence, as preparation for the festival of Easter. On the Sunday before Easter, Palm Sunday, is commemorated the triumphal entry into Jerusalem. The days having the greatest significance in the following week are: Wednesday, frequently called *Spy-Wednesday,* which recalls the betrayal of the Master by Judas; *Holy Thursday,* observed in memory of the Last Supper and the institution of the sacrament of the Eucharist (see *Maundy Thursday*); and Good Friday, which commemorates the death of the Saviour. The observance of Good Friday as a legal holiday is largely increasing among English-speaking people, even among denominations other than that of Roman Catholics. G.W.M.

HOMAGE, *hom'aje,* in the feudal system of the Middle Ages, was the solemn declaration of allegiance by a tenant or vassal to his lord. During this ceremony the tenant knelt and placed his hands between those of his lord and proclaimed himself the latter's vassal. The lord

then gave him a kiss on the cheek and raised him to his feet (see CHIVALRY). Homage was abolished by statute in 1660. In modern English law the term is still used to describe the oath of allegiance taken by the nobles on the coronation of a new ruler; it also applies to the oath taken by a newly-appointed bishop or archbishop to the head of the Church.

HOME DECORATION. See INTERIOR DECORATION.

HOME ECONOMICS, *e ko nom'iks,* or **HOME-MAKING.** Home-making is the oldest, best-known and most inclusive profession the world has ever known. Because it is largely a labor of love, beyond the province of commercialized calculation, it has failed to receive the recognition awarded other skilled professions from state and national bodies. It has for many years been studied, if at all, under the name *Domestic Science,* but such a term is forbidding rather than inviting. Home-making is not a standardized profession, but therein lies its charm. The home is the only place in all the world in which there is an opportunity for untrammeled growth, without fear of criticism, in all that goes to make men and women great. The home should be the centralizing power of all that love and hope and joy are capable of bringing together.

The home-maker, more than any other individual, is governed by circumstances, conditions and environment. One of the greatest resources of the home-maker is the ability to meet all of the foregoing conditions and emergencies graciously and efficiently.

The duties of the home-maker in the various departments of home-making known as home economics, domestic science, child study, physical development, interior decoration, first aid, etc., are as diversified and important as those of the general manager of one of the great railroad systems of the country to whom is intrusted the transportation of men and women.

Such a general manager has gained his position through actual experience in the discharge of various duties in each division under his control. His business is so to correlate and harmonize those departments that they will, as a whole, serve the people safely and well. The successful home-maker gives her family the same efficient service.

The general manager must understand and be able to meet the many unexpected conditions and emergencies that cannot be scheduled; so must the home-maker. If there is a collision or a washout the manager of the railroad must have his forces so well within his grasp that repairs may be made without undue loss of time or energy; in a like manner must the home-maker meet the everyday emergencies of the home. The railroad manager deals with both the theory and practice of technical construction in material things, in order that human life may be safe. The home-maker, who deals with the growth and development of that human life, should have as great an understanding and as definite a knowledge of the many materials and processes that go to make up the efficiency of the home and the life of its inmates.

The home-maker should be as thorough and efficient in the management of the home as the business man is in the management of commercial affairs, and added to that great field of systematic efficiency must be that love and human sympathy of which the commercial world is oftentimes forgetful. The home-maker, to whom is intrusted the development of human life and growth, must understand the needs of human construction; must understand that the mind is made to plan and command control; and must understand the function of the brain forces, and their capacity and ability to control the physical being.

The home-maker cannot conceal inefficient service in the home, for sooner or later the school and the business world must harvest the home crop. It depends upon the home-makers

of the country to determine what the national harvest shall be. Each member of a family must be some kind of a home-making unit. No one can be free from personal responsibility. Each activity of the home represents a different problem, which the home-makers must unite into a harmonious productive unit, of value to itself and the community.

The home and the business life are on an equal basis of importance in the development of human efficiency. The home, the school and the business world are important educational factors for the development of national efficiency; one cannot exist without the help of the other. They are also equally responsible in the education of the individual. The higher the standard of the home, the greater will be the efficiency of the nation.

Because it is impossible to consider home-making from the commercial standpoint only, it has been neglected and overlooked. It has been looked upon as an occupation quite beneath the dignity of learned student bodies until within the last few years. More attention was formerly devoted to the finding of a husband or wife and trusting blindly to the future than to the great problem of home-making, which should be the ultimate aim of this great partnership.

What the Home Demands. The first great question which meets the home-maker is that of the family income and its division among the diversified needs of the home. The purpose of every home is comfort, but comfort does not mean ornate display and the purchase of certain articles for the purpose of keeping up appearances. When we consider the immense sums of money expended by home-makers annually just for the necessities of life, the question of buying becomes an important national as well as home problem.

There is no use in telling that housewife how to divide the weekly salary wisely who never sees it until after the husband has not only divided it, but retained all but the last ten per cent. The wives of such men are not real home-makers; they cannot be, for they have at this stage an inferior tool with which to do the work. No matter what the family income may be, the average man knows that it must be divided according to the needs of the family, with something laid aside for emergencies or for old age.

Buying for the Table. A logical method of buying for the table may be briefly stated, as follows:

First. There must be actual knowledge of the amount of money that may be set aside each month for table expenses.

Second. Divide the table appropriation into as many parts as there are members in the family, including in this division expense of fuel, service and ordinary waste, thereby making the table appropriation a mathematical problem as well as a scientific proposition.

Third. Study the market and purchase only those foods that contain, when prepared for the table, equally-balanced portions of carbohydrates, minerals, proteins and fats (see Food).

Fourth. Do not purchase foods out of season.

Fifth. Do all special entertaining, if it is possible so to plan it, when fruits and vegetables are in season.

Sixth. Buy in bulk whenever possible.

Whatever is put into the stomach must have both present and future value. Growth, energy and efficiency depend upon the kind of food that is eaten, and upon one's ability to digest it. The first introduction to good digestion is attractiveness. Unattractive food sows the seed of indigestion through its repulsiveness before it has entered the stomach. The digestive apparatus is not efficient when the mind is in a repellent state. Buying and cooking are really the beginning of digestion; the activity of the cells in converting the food into liquid before it reaches the blood must do the rest.

The buyer should learn to think and speak in terms of carbohydrates, proteins, fats and calories. The constant application of these terms to the daily purchases will greatly facilitate one's ability to supply the table with those foods that supply bone, muscle, tissue, warmth and energy to the family. Habit usually guides an individual in the choice of foods. Home-makers may through their wise selection greatly assist in the formation of food habits.

When buying in small quantities, watch well the weights and measures. Short weights waste many a dollar for the home-maker. Consult with the grocer, but do not depend entirely upon his judgment. He is there to supply your demands and cannot be the best judge of what foods will supply the greatest needs of the family. Personal attention to every article purchased is the only solution of the buying problem.

Every buyer should have the proper equipment for the preparation of the foods. There should be a cool storeroom, a space that may be filled with emergency foods. Such a room should contain a good supply of canned goods (preferably home-prepared), fruits, vegetables, smoked and dried meats, salt fish, dried fruits, rice, beans, oatmeal, corn meal flours of vari-

ous kinds, cheese, condensed milk, olives, prepared oils for cooking, and such vegetables as will keep.

Bread. As about two-fifths of the ordinary weight of food consumed by the average family is bread, it becomes the most essential food product of everyday life. As more bread is made from wheat than from any other grain, wheat is the raw material which should be best understood by the buyer.

In point of economy, there is very little difference between home-made and bakers' bread; but there might be a great difference in the food value if home-makers understood how to secure the best results in food value from every bushel of wheat used in bread-making.

The most important food essentials are found in the outer layer of the perfect wheat kernel. The bran and the germ contain essential food values. The old process of milling did not eliminate these substances, but the keeping qualities of the flour were impaired. The highly-milled white flour differs greatly in different sections of the country, owing to the different kinds of wheat grown. Mills of the Northwest use the spring wheat, those of the Southwest the hard winter wheat; in some sections only soft winter wheat is milled. Some millers use a combination of wheats to secure different grades of flour.

There is no absolute standardized test for the quality of flour by the consumer except through its use, consequently it is best for the home-makers to adopt the brands that give them the best results, when used according to individual methods. As the highly-milled flours which are commonly used in bread-making lack some of the most nutritious elements of the natural grain, the home-maker has learned to introduce coarse flours, such as bran, oatmeal and corn meal, in order to produce a properly-balanced food for the family. This method increases the cost of the bread without bringing adequate returns. The different flours and meals thus used are milled separately and the buyer must pay for two processes instead of one. He pays for the process of division, although nature originally combined the different flours in one grain.

It is not the price of foods that should claim our attention, but the manner in which the food is produced. Every buyer should know the food value of every natural product, in order to purchase table supplies intelligently.

All whole wheat flours and cereals should be 100 per cent wheat, if the best results are to be obtained when they are used as human food. Whole wheat, whole oatmeal, unpolished rice and unpearled barley each contain essential nutritive substances that are removed through the modern process of preparation for the market. The adoption of whole-grain foods would mean an increase of at least twenty-five per cent in the health of many people. In this connection it is worth noting that nothing is expensive that gives full return for the money and time expended. The cheapest foods, from a money standpoint, may be the most expensive in the end. All denatured, bleached, degerminated, polished and otherwise doctored foods are relatively weak in food value. Every purchaser of foods should understand that pure whole-wheat flour contains all the food elements demanded by the normal adult, although it may be too heavy for invalids and children.

Whole wheat contains a larger proportion of brain and nerve food than any other article of diet. The purchase of whole wheat and corn products, together with an intelligent understanding of their use in the daily menu, is one of the most important items in the budget of the modern home-maker. Housekeepers should gradually replace the highly-milled white flour with attractive dishes of whole oats, whole wheat and corn meal, which may be made into many different kinds of bread, boiled and baked puddings, cakes and biscuits.

Meats. Next to grain foods, the most important material for the furnishing of the table is the meat. Good buyers must study their composition. Meats furnish the material necessary for the growth and repair of the body, but they should be used with discretion, as an excessive use of meat is one cause of ill health. Temperance in eating is just as important as in drinking.

The price of meat depends upon the cut more than upon the nutritious quality. Plenty of vegetables should be used with all meat rations. The quick-cooking cuts of meat are the most expensive, but the food value is no greater than that of the cheaper cuts; the latter require longer cooking because they are taken from the active parts of the animal and are somewhat tougher in fiber. If it were not for the word "stewing" and the occasional unsightly appearance, as well as the insipid flavor, of most stewed meats, the cheaper cuts would be more popular; many of them are really more nutritious. Scientific cooking has taught the home-maker how to make the neck and shoulder pieces into attractive dishes at a minimum

ense. Meat that was at one time used or stews is now roasted in an air-tight acle, browned and garnished until it re- s a tenderloin in appearance.

n selecting meat, note that it is dry on rface and feels soft and firm to the touch, t hard. The round steak from a fat ani- better than the finest cut of porterhouse a lean or old animal. Meat from a fat l has higher food value than that from animals. An experienced buyer soon to know the quality of meat from its and general appearance. Beef is a rich, ed when first cut; it might be described luish-red, but it grows lighter and brighter its exposure to the air for a short time. it is white. Old beef is of a dark brown- l, with yellow fat. Veal is a dull bluish- The younger the veal, the more the blue ninates in the pink. Mutton is a dull, pink or grayish red, with white fat. is lighter in color than mutton; it is pink in color and has slightly-pink bones. it its best has a streak of fat and a streak n of good color and firm texture.

buying poultry it is well to select the iens when they are alive, as it is easy ermine healthy stock by noting appear- There should be fatness and plumpness. l infested with lice and fleas is not at its A young, healthy fowl has bright eyes, h legs, plenty of pin feathers, and the f the breast bone is soft.

se, ducks and pigeons are good for eating hen they are young. Great care must be ed in the selection of fish. See that it is with scales firmly set; the eyes should e absolutely lifeless; the tail should not . Every part of the fish should hold to- and be firm to the touch. Never pur- fish that has a strong odor.

etables. Between bread and meat there great variety of vegetables which con- ll of the different properties required to e a perfectly-balanced menu. Prepara- f foods becomes an interesting study as is their composition and uses are thor- mastered. Perfect buying is only at- when the buyer understands just what of food are required to develop the human so that it may perform normally all of ctions. Vegetables supply most of the , iron and other minerals required by the e individual. As most vegetables keep t is best to purchase them in compara- large quantities when they are in sea- son and are not expensive. They may be pre- served by being buried in sand in a dry cellar, and by canning.

Vegetables are best steamed or boiled in a small proportion of water, as most of the min- eral salts lie near the skin. When buying rooted vegetables, select those that are smooth and tender. The tops should be fresh. All green vegetables for uncooked salads should be fresh and crisp. Never purchase canned vegetables when fresh ones may be obtained, as the process of canning removes some of the most important food qualities. In selecting canned goods, be sure that the can does not bulge. The materials in bulging cans are al- most always unsafe as food, for fermentation is indicated. Never buy old canned goods; as foods they lose in quality after having been canned a year.

Tea and Coffee. Purchase only in small quantities, unless coffee is browned in the home. The latter is becoming a neglected art. Green coffee may be purchased safely in large quan- tities, as the berry improves with age until after it is browned; then it quickly loses its flavor unless it is immediately placed in air- tight cans. Cheap teas are the most expensive in the end, as they are not as strong as the slightly more expensive and require more tea for each person. Black tea goes through a process of fermentation in the curing and is less liable to cause indigestion and nerve trou- ble than green tea. Green tea contains a larger amount of tannic acid than black, and is more harmful. In buying tea, select that which is free from stems and dust.

Coffee, like tea, is a stimulant, and has no real food value. When tea, coffee and sugar are high in price, purchase in small quantities. When they are cheaper, purchase in larger quantities.

Have a Bank Account. It is the function of the home-maker to plan, provide and execute according to the family income; consequently every home-maker should have a bank account, no matter how small. A bank account teaches thrift and self-respect. The simpler banking methods are important business methods that every home-maker should understand and prac- tice.

Every check that passes through the bank is a receipt. Bills paid through the bank cannot be disputed. One soon learns of many ways and means that will add to the bank account.

Extravagance. One of the most ill-advised methods of buying is to believe that one must

have the very earliest products or must purchase an article because it is popular. Never purchase a thing because it is the latest "craze." Purchase only those things that are adapted to the needs and comforts of the family, and not out of season.

Economy demands constructive thinking and constructive planning in order to avoid the purchase of useless things, thereby incurring waste. Have a definite idea and purpose; buy for the health, comfort and progress of the family and not for the purpose of keeping up appearances.

It is extravagant to purchase articles of wear or for the home that are not in any way related to those already in use. Such things add to the expense without bringing adequate returns in comfort and happiness. T.V.M.

Consult Richards's *The Art of Right Living;* Bevier and Usher's *The Home Economics Movement;* also the current issues of the *Journal of the American Home Economics Association.*

Related Subjects. These volumes contain many articles which will be helpful in a study of home economics, and the following are especially recommended. Many of them have extensive lists of related subjects, so that the range of reading is a wide one.

Adulteration of Foodstuffs and Clothing	Food Products, Preservation of
Baby	Furnace
Canning Clubs	Furniture
Child	Heating and Ventilation
Child Study	Household Arts in Education
Cookery	Industrial Art
Domestic Art	Interior Decoration
Domestic Service	Physical Culture
Education	Pure Food Laws
Electricity	Sanitary Science
Embroidery	Sewing
Fireless Cooker	
Food	

HOMEOPATHY, *ho me op' a thi,* a system of internal medicine, the fundamental principle of which is based on the law, *Similia similibus curantur* (Like cured by like). Though referred to by several physicians before the eighteenth century, it was first given practical application by Dr. Samuel Hahnemann of Leipzig, about the beginning of the nineteenth century. He applied the name *homeopathic* to this system to distinguish it from the old school, which was called *allopathic* (see ALLOPATHY). The last two syllables of these words come from the Greek word for *feeling,* or *disease; homeo* is from the word for *similar,* and *allo,* from the word for *other.*

Hahnemann's theory was that a drug which will produce certain disease symptoms in a healthy person will cure a sick person presenting the same group of symptoms. To determine the curative properties of various drugs he "proved" them in the following way: A dose of the medicinal preparation chosen for the test was given to a healthy person at certain intervals until deviations from normal health were produced, and during the process his symptoms were carefully noted. These symptoms were recorded and compared with those noted in various diseases, and the drug producing them was selected as the remedy for the disease having the given or similar symptoms. More than ninety drugs were proved by Hahnemann in experiments upon himself and others.

The homeopathist believes that for curative purposes the poisonous principles in powerful drugs, such as belladonna and aconite, should be reduced until the remedy is incapable of producing drug effects; therefore a physician of this school would not prescribe strong, bitter-tasting medicine for curative purposes in curable diseases. Since the time of Hahnemann the tendency in all medical practice has been to administer simpler forms of medicine and these in smaller doses.

Homeopathy has never met with the same favor in Europe as in the United States; in the American Union there are at present about 15,000 homeopathic physicians and ten medical schools in which Hahnemann's theories are taught. In Canada, where the different provinces control the licensing of physicians, Quebec is the only province having a separate homeopathic board of examiners. This is known as the College of Homeopathic Physicians and Surgeons of Montreal. In Montreal there is in active operation a homeopathic hospital. In the province of Ontario the homeopathic and allopathic schools are united for examining purposes into one board called the medical council.

The principle, "Like cured by like," is the foundation of the treatment of disease by blood serum. See SERUM THERAPY; also, HAHNEMANN, SAMUEL CHRISTIAN. J.P.C.

HO'MER, one of the greatest names in all literary history, and the oldest in the literary history of Europe. Scholars have written long and learned books to prove that such a person never existed—that the poems ascribed to him were the product of generations of minstrels; but despite these his name will stand to all time as that of the author of two of the world's supreme epics, the *Iliad* and the *Odyssey.*

The Greek Idea of Homer. The ancient Greeks, who regarded his works as classics and

made them the center of a literary education, did not question his real existence. To them he stood as a gigantic figure, blind but powerful, shrouded in the mists of the past, and they produced many biographies of him. With nothing but legend to draw upon, these differed even in their statements of his birthplace, and later writers made an epigram on the subject of their disputes:

Seven wealthy towns contend for Homer dead
Through which the living Homer begged his bread.

All of these old "lives" agree on a few points—that Homer was blind, that he was very poor, and that he wandered about from town to

"A READING FROM HOMER," BY ALMA-TADEMA

town chanting to the music of his lyre those rhythmic sagas at which the world has not yet ceased to wonder. As to the time he lived, there was wide difference of opinion, some placing him as far back as the early twelfth century B. C., some—though these are fewer—as late as the seventh.

It is known that the poems were recited in Sparta as early as 600 B. C., and from that time on their reputation grew. Powerful rulers took time from their war-making to see that his works were properly edited and arranged; each city had its own valuable copy; and Alexander the Great, it is said, slept with these "divine poems" at his head. Later, when knowledge of the classics was lost to Western Europe, it was kept alive in the Byzantine Empire, and a renewed interest in the writings of Homer made up a large part of that wonderful awakening known as the Renaissance.

Modern Views. When modern critics began to study this most famous poet of the past they differed not at all from the ancient Greeks in the honor which they were willing to pay to his name, but they found themselves confronted with many questions. First, they denied his authorship of all the minor poems accredited to him, and then began actually to doubt his identity. They saw in his name merely the word "compiler," through the centuries invested with the force of a proper name, and they thought they found indication that more than one man and more than one age had contributed to the wonderful poems. It is a question which, in the nature of things, can never be settled, but fortunately it is not vital.

What is vital is the charm of the poems—the rapid movement, the simple, noble style, the stately music of the long lines, the characters who even to-day stand out as living persons. Vital, too, is the great debt modern scholarship owes to the *Iliad* and the *Odyssey* for knowledge of the very ancient Greeks. Save for them, little would be known about the Greek ideas of the gods and their attitude toward human affairs, or about the great heroes and their marvelous doings, nor would information as to Greek modes of life be nearly as full as it is.

To later poets, Homer's works have been a never-failing source of inspiration. More than one distinguished writer has translated them in whole or in part, Pope's rendering being perhaps the best known. Smooth and pleasant as

the latter is, however, it misses the majestic spirit of the original, and one of Pope's appreciative but frank friends said to him on its publication, "It's a pretty poem, Mr. Pope, but you must not call it Homer." C.W.K.

Consult Seymour's *Life in the Homeric Age;* Jebb's *Introduction to Homer.* A good book for young people is Church's *Stories from Homer.*

Related Subjects. The following articles in these volumes may be consulted in connection with this article on Homer:

Epic	Mythology
Greek Literature	Odyssey
Iliad	Renaissance

HOMER, LOUISE, an American contralto who has won fame in grand opera. She was born in Pittsburgh, Pa., and before her marriage was LOUISE DILWORTHY BEATTY, the daughter of a Presbyterian clergyman. Her talent was early recognized, and after witnessing her first grand opera performance in Boston, she heeded the advice of her teachers to study abroad, with the object of an operatic stage career. After three years of earnest study she was enabled to sing in opera with the same stars whose performance she viewed on the night which marked the turning point of her career. She made her first professional appearance in Paris in 1898 as Leonora in *Favorita.* Since then she has become a favorite in Paris, London and Brussels and in the leading American cities. Her repertoire includes many of the leading operas, and her career has been one of uninterrupted success. Although her professional life absorbs much of her time, she is the devoted mother of five children and takes especial delight in managing her own home. She is the wife of Sidney Homer, a song writer, many of whose compositions she sings in her recitals.

LOUISE HOMER

HOME RULE, in British politics, a phrase associated with Ireland's attempts to secure self-government. Ever since the Act of Union of 1801, which united Ireland and Great Britain under a single parliamentary government, there has been dissatisfaction in Ireland with the existing government, at times reaching the point of open rebellion. Ireland has, in fact, been ruled from London, and the Lieutenant-Governor and his subordinates stationed in Ireland have usually done little except to obey orders from home. Almost from the first there have been Irishmen who wanted Home Rule, the leading feature of which is a native Parliament, to pass all local and internal legislation; the general political government of the Empire would be left to the imperial Parliament, as before.

Ireland, in short, has never asked for a greater degree of self-government than has been given to the Dominion of Canada and several other British dependencies. The arguments in favor of Home Rule are those by which any nation seeks to maintain its political independence. Against Home Rule is the fact that Scotland and Wales have no separate Parliaments. There is in Ireland, moreover, a strong Protestant minority which is bitterly opposed to Home Rule because it prefers to be ruled from London rather than by the Catholic majority at home. This opposition is greatest in Ulster, and particularly in the vicinity of Belfast, where civil war had all but broken out when Home Rule finally seemed inevitable.

Home Rule first became the dominant issue in Irish politics about 1870. In that year the Home Government Association was organized at Dublin for the purpose of "taking Irish affairs out of English hands." This association represented all shades of religious and political beliefs, with the Protestants and Conservatives in control. In 1874 about sixty "Home Rulers" were elected to Parliament, in which they voted as a unit on Irish questions but followed their personal inclinations on all other matters. By 1881 there was a split among the Irish members in Parliament, one faction being conservative, the other, led by Charles Stewart Parnell, adopting extreme views. The Parnellites linked the Home Rule issue with the economic issue of land reform, and in this way antagonized the conservative land-owning classes. Thus it happened that Home Rule, supported by millions of Roman Catholic peasants, lost the support of the Protestant middle class which had first controlled the movement.

Parnell's tactics, however, were successful in that the elections of 1885 gave him the balance of power between the Liberals and the Conservatives. In the next year Gladstone and other leading members of the Liberal party announced their conversion to Home Rule

principles. Even Gladstone, however, was not powerful enough to secure the passage of a Home Rule bill in 1886, and in 1893, when he tried a second time, he was again defeated. Under the Conservative ministries of Lord Salisbury and Arthur J. Balfour considerable progress was made in improving economic conditions in Ireland and in granting some degree of local self-government, with the result that the Home Rule agitation almost disappeared, and it was not until after the Boer War that the movement gained new strength.

Under the leadership of John Dillon and John Redmond, the Irish Nationalists, however, remained a powerful minority in Parliament. The general elections of 1910 again gave them the balance of power, and their support was frankly given to the Liberal ministry because the latter agreed to introduce a bill for Home Rule. Accordingly, in 1912 and 1913 Premier Asquith introduced such a bill; both times it passed the House of Commons, but was defeated in the House of Lords. By the Parliament Act of 1911, however, any bill which has been passed in three successive sessions of the House of Commons becomes a law without the assent of the House of Lords. The Home Rule bill was introduced for the third time on March 5, 1914, and was passed on May 25.

HOW IRELAND DIVIDES ON HOME RULE

The white section of the map shows where the Home-Rulers live, and the shaded section shows the Ulster counties against Home Rule. The *Irish World* claims that 17 of Ulster's 33 representatives in the House of Commons are for Home Rule. Five of her nine counties favor it by a large majority. The shaded section has a Unionist majority, but also a strong Home Rule minority, represented in 1917 by five members in the House of Commons.

The progress of the bill through Parliament was marked by great bitterness in that body, by demonstrations of approval in Dublin, and by equally enthusiastic demonstrations of opposition in Ulster. The Ulstermen, led by Sir Edward Carson (which see), formed a volunteer militia, and prepared for armed rebellion against any attempts to enforce the law. So bitter and determined were the Ulstermen that some compromise became necessary, and in June, 1914, the ministry introduced an amending bill, which provided that each county in Ulster might vote on the question whether or not it should be excluded for a period of six years from the operation of the law. Before this amendment could be passed, Great Britain was drawn into the War of the Nations, and Parliament passed a bill postponing the inauguration of Home Rule until the end of the war. In May, 1916, England's most active enemies among the Irish in Dublin fomented a revolution, said to have been encouraged by Germany, and attempted the establishment of a republic. In four days over 200 people were killed, but the heads of the insurrection were caught and shot as traitors and the trouble gradually subsided. Again, in March, 1917, hostility to the government developed; the Irish Nationalists attacked the policy of Premier Lloyd George, hoping to force a general election which might further their cause. The Premier desired that the various parts of Ireland should exercise their choice as to Home Rule, but this was repugnant to the Nationalists.

Municipal Home Rule. In American politics the phrase *home rule* is associated with the movement to secure complete self-government by cities, without interference by the state. Until recently it was the theory and practice in the United States that the city was created by authority of the state. A city almost invariably had to go to the state legislature for every change in its method of government and frequently even to increase or reduce the salaries of city officials. This was a condition which existed without good reason, for a city and a rural district have almost no problems in common. The men who are familiar with the former's needs should not be compelled to ask favors of the latter.

Home Rule for cities was first adopted in a number of the Western states, and has gradually worked its way east to the Atlantic coast. The leaders in the Home Rule movement were California, Oregon, Washington, Idaho, Colorado, Texas, Oklahoma, Nebraska and Minnesota. Ohio and Michigan are among the Central states which have Home Rule for cities, and New York was one of the first of the Eastern states to adopt it, although not completely. W.F.Z.

Consult Gladstone's *Special Aspects of the Irish Question;* Conlan's *On the Threshold of Home Rule;* Monypenny's *Two Irish Nations.*

HOMESTEAD, *home'sted,* PA., a borough in Allegheny County, in the southwestern part of the state, eight miles south of Pittsburgh, of which it is a suburb. It is on the Monongahela River and on the Pennsylvania and the Pittsburgh & Lake Erie railroads and on interurban electric lines. The area is little more than one-half square mile. In 1910 the population was 18,713; in 1916 it was 22,466, by Federal estimate. A large proportion is foreign born.

The immense steel plant at Homestead, one of the largest in the United States, has 7,000 employees and produces structural steel and nickel-steel armor plate. The borough was settled in 1871 and incorporated in 1880. It has a Federal building, a Carnegie Library, a public hospital and a public park.

HOMESTEAD LAWS, in the United States and Canada, include measures of the national government to give farms, or homesteads, to settlers, and statutes of state and provincial governments protecting the settlers after their entry upon the homesteads.

To obtain a free farm from the United States government it is necessary to live upon a quarter-section (160 acres) of the public lands for three years, cultivating a certain amount of ground each year. In some regions where irrigation is impossible, a half-section may be occupied. Any man over twenty-one years of age who is or intends to become a citizen of the United States, or any person, man or woman, who is the head of a family, may become a homesteader and receive a *patent,* or title, to the public land he selects. The only expense is a small fee. A soldier who has seen war service may count his time of service as part of the required time of residence on a homestead.

In Canada a homesteader must reside upon his quarter-section during six months of each of three years and break at least thirty acres, of which at least twenty must be cultivated. If there is not this amount of arable land in the quarter-section, the ownership of live stock may be substituted for cultivation. In certain districts an additional quarter-section may be obtained by *preëmption;* three dollars an acre must be paid for this latter land and fifty acres of it, or a further fifty acres of the homestead, must be cultivated. In some districts homesteads may be purchased. Any man who has reached the age of eighteen years and is a British subject, or intends to become one, or any person the sole head of a family, may acquire a homestead or preëmption. Veterans of the South African War were granted two adjoining quarter-sections of land if they settled upon and cultivated them. For additional information and a diagram of the division of land into quarter-sections, see LANDS, PUBLIC.

State and provincial legislation regarding homesteads is usually in the nature of protection of the homesteader against those to whom he owes money. C.H.H.

Consult Thompson's *Homesteads and Exemptions;* Waples' *Treatise on Homesteads and Exemptions.*

HOME WORK AND SCHOOL CREDITS. See SCHOOL, subtitle *School Credits for Home Work.*

HOMICIDE, *hom'i side,* a word derived from the Latin *homo,* meaning *man,* and *cedere,* meaning *to kill,* is the killing of one person by another. One of the chief concerns of all systems of law has been the nature of the responsibility of a slayer to the state and to the family of the person slain. Homicide includes accidental and justifiable killing, as well as murder committed wilfully. Excusable, or justifiable, homicide is that which takes place under circumstances of accident or necessity; in either case it cannot be said that the act was intentional, but was committed in self-defense or in the protection of one's family or property. Excusable homicide is not punishable at law, if committed without any fault or intention on the part of the slayer. Homicide is justifiable when committed under such circumstances of duty as prevention of murder, or other atrocious crime, or to prevent the escape of a criminal. All other homicides are punishable as manslaughter or murder, with penalties of the severest nature. See MURDER; MANSLAUGHTER.

HONDURAS, *hon doo'ras,* the third largest of the Central American republics, but the

most unprogressive of all. Like its southern neighbor, Nicaragua, it is a land of wonderful resources lying idle for lack of enterprise, transportation facilities and money. Bounding it on the west is Guatemala; on the north is the Caribbean Sea, on the east and southeast, Nicaragua, and on the southwest, the gulfs of Fonseca and Salvador. It covers an area of 44,275 miles and is almost as large as the state of Pennsylvania. Its population, however, estimated at 562,000 in 1914, was only one-fourteenth that of the state named, and averaged about fifteen persons to the square mile. The name Honduras is Spanish for *depths,* and was given to the country because early Spanish explorers had difficulty in finding anchorage off its shores.

LOCATION MAP

The illustration shows the position of Honduras with respect to its sister republics, and the proportion of Central America it occupies.

Climate, Land and Products. Honduras is largely mountainous, and is rich in tropical vegetation. Earthquakes are less frequent there than in other Central American countries.

The coast lands are low, those at the north and east being excessively hot and not healthful for the white race. The rainfall throughout the entire country is heavy, owing to the trade winds. The climate of the interior is healthful, being moderate in temperature and not very damp. The country is well drained by numerous rivers, most of them flowing into the Caribbean Sea. Nearly all, however, are obstructed by rapids. Of those which are navigable the Ulua, flowing through the banana lands, and the Segovia or Wanks, forming part of the boundary with Nicaragua, are most important.

The chief products of the republic, bananas and cocoanuts, come from the hot Caribbean coastal regions. Nearly 8,500,000 bunches of bananas and 8,000,000 cocoanuts are exported annually, and most of them, together with other tropical fruits, find a market in the United States. Rubber is also produced and coffee is grown, but labor for harvesting the crop is scarce. Tobacco is an important product, and that raised in the Department of El Paraiso is known for its excellent quality. Maize, the principal food crop, beans, wheat, rice, sugar and plantains are raised for home use. Stock raising is an important industry.

The mineral resources of Honduras include gold, platinum, silver, copper, lead, zinc, iron, antimony and nickel; some minerals are found in almost every part of the country. Among Central American republics Honduras ranks next to Nicaragua in mineral wealth, but mining industries are only slightly developed. Cigars and straw hats are the only home manufactures exported.

Transportation and Commerce. There is no communication by railroad between the Caribbean and Pacific coasts. Transportation is by mule-train and ox-carts, and the distance of less than two hundred miles, which by railway could be traversed in a half day, now takes three weeks. Very little is done in the making or repairing of roads. The total length of railway in 1913 was 150 miles and was used principally to handle the banana crop. Railroads are government property, and extensions are contemplated. In April, 1914, there was pending a proposal made by an American corporation, the United Fruit Company, whereby the company would pay the government of Honduras $400,000 cash and $1,000,000 in forty yearly instalments, for the control of the railways for ninety-nine years.

The most southerly part of Honduras is the island of Amapala, in the Gulf of Fonseca. It is one of the best natural harbors on the Pacific coast, and the opening of the Panama Canal will probably increase commerce through that port. On the Caribbean coast the ports of Puerto Cortez, Cerba and Tela are visited by boats of three American companies. Trujillo is also an important northern harbor. Exports of Honduras are estimated at over $8,000,000, and imports at more than $5,000,000 yearly.

People and Government. Most of the people are Indians or of Spanish-speaking castes, and about 90,000 are but little civilized. There are a few Europeans and Americans, who control fruit exports and mining concessions. The natives are very unprogressive, and such economic importance as the country has attained is due not so much to their efforts as to the natural resources of the land, and to foreign money and enterprise. The largest town is the capital, Tegucigalpa, situated on a south central plateau.

Instruction is free and compulsory, but only about 26,000 pupils attend the 900 primary schools each year. There are some institutions for higher education, including a central university and normal school at the capital. The prevailing religion is Roman Catholic, but all creeds are permitted.

Under a constitution adopted in 1894, executive authority is vested in a President elected by popular vote for four years. Legislative power rests with a Congress of Deputies chosen by popular vote for four years, in the ratio of one deputy for every 10,000 people. For administrative purposes the country is divided into fifteen departments, or small states, over each of which is a governor appointed by the President.

History. As with all the republics of Central America, the history of Honduras is one of Spanish rule and oppression, then revolt and freedom, followed by internal dissensions. The principal events will be found in the article CENTRAL AMERICA. H.M.S.

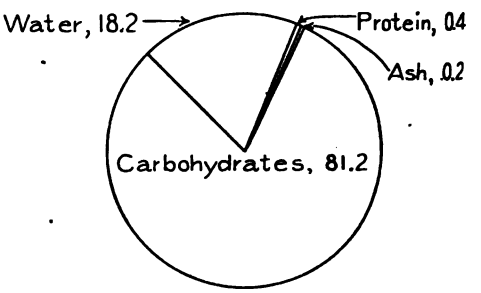
Related Subjects. For further information on the subject of Honduras, the reader is referred to the following articles in these volumes:

Banana	Tegucigalpa
Central America	Trade Winds
Cocoanut	Walker, William

HONE. We use hones for sharpening scissors, knives, chisels, razors and other tools on which we wish to set a fine edge, and we use whetstones for sharpening scythes, axes and tools whose edge does not need to be so fine. A hone, then, is a stone used for sharpening edged tools. The difference between a hone and a whetstone is in quality only. Whetstones are made of sandstone and are coarse grained; hones are made of a different stone and are fine grained. Carborundum (which see) is now used for many of the finest hones, though a clay rock known as novaculite, if of good quality, cannot be surpassed. The finest novaculite hones in the world are found in Arkansas. A pine log which has been under water long enough to be turned to stone furnishes excellent hones, but this source of supply is naturally limited. The surface of a hone should be smooth and even, and oil or lather made from soap should be placed on it when it is used.

HONEY, *hun'i,* a syruplike liquid, of spicy sweetness and pleasing taste and flavor, one of Mother Nature's most welcome contributions to the food of man. To provide him with this agreeable delicacy she placed nectar within the flowers, and she taught the honeybee how to convert it into a delectable and nutritious food. This is explained in the article BEE, subtitle *The Honeybee.*

The flavor and color of honey vary according to the flower from which the nectar is obtained, that from white clover being one of the most agreeable of the light-colored varieties. An excellent dark-colored honey is made from the nectar of the buckwheat. Because of its high percentage of carbohydrates (mainly



COMPOSITION OF HONEY

Its fuel value is 1475 calories per pound. It is therefore equal to the best round steak as a heat producer.

grape sugar and fruit sugar), honey is quite nutritious, but only a small quantity should be eaten at one time, and not oftener than at three or four meals in a week. In addition to its use as a food, it is often found in cough preparations, and it is also valued for its mildly laxative properties. In Oriental countries honey is used extensively in making cakes and sweetmeats and in preserving fruit.

The production of honey for the market and for domestic use has become an industry of great importance. A detailed description of this industry may be found in the article BEE, under the subhead *Bee-Keeping,* page 652. In amount of honey produced the United States leads the world, with an annual output of about 62,000,000 pounds, valued at over $6,000,000. Canada produces over 6,000,000 pounds a year, with a proportionate value. The chief European countries in this industry are, in order, Germany, Spain, Austria-Hungary, France, Holland, Belgium, Greece, Russia and Denmark.

As the ancients possessed no other form of sugar, honey was prized very highly by them. To the Hebrews it was the symbol of abundance; Jehovah, in *Exodus* III, 17, gives the promise to Moses that the Children of Israel shall be led from Egypt into a "land flowing with milk and honey." Many allusions to it are found in Greek and Roman writings.

OCUST, SWEET LOCUST, or **UST,** a beautiful tree closely re- acacia. It grows to a height of ghty feet and has extremely grace- en foliage. Seeds are grown in abedded in a mass of sweet pulp. lp sugar has been made, and when yields an intoxicating spirit for- prized by the American Indians. bear many three-pronged thorns, localities it is called the three- a. The honey locust is very popu- ration in parks and gardens. See

CKLE, *hun'i suk'l,* a family of bs which bear trumpet-shaped, lowers. Various species are found zones all over the world. The d species lure sphinx moths in The ey- its low acts With ich hout -yel- the ipet, kle ning n to irds, hem

TRUMPET HONEYSUCKLE

the sweets it holds. All species een, oval leaves which are usually and grow opposite each other in me honeysuckle shrubs it seems as woody stems grow right through Most shrubs of this family are r nearly so, and when the flowers ight crimson berries take their y birds eat these berries, and so re widely distributed. Honey- along waysides or in tangled r beautify porches, walls, or trel- ns. In his *Marmion* Scott says:

honeysuckle loved to crawl
he low crag and ruin'd wall.

are also called *woodbine,* and are e twisted *eglantine* mentioned by

NG, popularly known both as an city by that name, is the great f British commerce in the Far East, and an important naval and military station. Hong-kong is, in fact, the name of the island only; it covers an area of twenty-nine and a half square miles, situated at the mouth of the estuary of the Si-kiang, ninety miles

LOCATION MAP

south of Canton. Separating it from the mainland is a channel varying from one quarter of a mile to a mile in width. The island is mountainous, covered with bare granite ranges and almost entirely destitute of vegetation. The city is *Victoria,* generally spoken of as Hongkong. It is a prosperous and beautiful town, with a magnificent harbor and every facility for loading and unloading the largest vessels. Nearly the whole of the population of the island is located in the capital, which is divided into a European and a Chinese section. The white inhabitants for the most part have their homes among the beautiful heights overlooking the city, harbor and sea.

In 1860 the peninsula of Kowloon was added to Hong-kong by treaty with China, and in 1898 China leased to Great Britain a further strip of land north of the Peninsula, also the island of Lan-tao. This newly-acquired territory is agriculturally the most valuable in the whole colony. In the dry season the climate of Hong-kong is healthful, but during the rainy period, from May to August, fevers prevail.

The chief industries are granite quarrying, sugar refining, gold beating, furniture making and the manufacture of cotton goods. The imports and exports are valued at more than $40,000,000 annually. The colony is administered by a governor, assisted by executive and legislative councils, in which the commanders of the naval and military forces hold important positions. The British originally occupied the island of Hong-kong in 1841, and it was finally abandoned by China by the terms of a charter dated April 5, 1843. Population in 1911, 366,-145, of whom 4,446 were Europeans and Americans, the remainder being Chinese and mixed races.

HONOLULU, *ho no loo' loo,* capital of the Hawaiian Islands, politically known as the United States Territory of Hawaii. It is situated on a good harbor in the south of the island of Oahu (*o ah' oo*), 2,089 miles southwest of San Francisco. From the position of the capital of an uncivilized kingdom of black people, Honolulu has risen in comparatively few years into great importance as a meeting point of commercial routes in the Pacific Ocean and as the most important distant naval station of the United States. The opening of the Panama Canal greatly added to its commercial and strategic value. (See chart, with article UNITED STATES, entitled *Pacific Areas of Control.*)

The harbor of Honolulu, with volcanic peaks rising high behind the town, is very picturesque. Passenger boats on arriving are immediately surrounded by a throng of natives who beg for dimes, for which they dive with great skill.

LOCATION OF HONOLULU

In the larger map the black area indicates the form of the city. The star in the corner map shows the location of the city in the Hawaiian group.

The docks and wharves are modern and excellently equipped, electric cars are of most modern design, and there is a modern railroad depot. The East and the West meet in Honolulu. Costumes of latest fashion are seen in the streets, mingling with the *holoku* worn by the native girls. The holoku is a very ill-fitting garment resembling the nightgown, the first costume prescribed for the natives by missionaries in the days when dress of any kind was considered unnecessary. Wooden houses still stand side by side with brick and stone buildings six stories in height, but there is practically no poverty in the city. There are hospitals, a public library and a college with over 700 students.

The chief industries are the manufacture of machinery, especially that used in sugar refining, rice milling and shipbuilding. The government buildings are large and handsome; the governor of the territory occupies the palace of the former Hawaiian ruler. King Kamehameha caused the United States flag to float over his palace more than ninety years before Hawaii became American territory; he adopted it as his own national flag because it was pretty. For more detailed information relating to the surroundings of Honolulu, see Hawaii. Population in 1910, 52,183.

HONOR, or **HONOUR,** *on' er.* A fundamental principle of an upright character is that composite virtue we call *honor*—a virtue that implies loyalty and courage, truthfulness and honesty, trustworthiness and self-respect, justice, generosity. No wonder it has been said that "Honor guards the way of life from all offense, suffered or done."

The man of honor keeps faith, not only with others, but with his own best self, recognising what is right and due, and "daring to be true" to that ideal, both in word and action. He scorns cheating, lying, thievery, bribery—dishonesty in all its disguises. He is scrupulous in living up to his promises, whether written or oral, so that men say of him that "his word is as good as his bond." He is prompt and direct in the discharge of duty. If his work makes him a servant of the public—soldier, doctor, captain, engineer, switchman, telegraph operator—he is faithful in the performance of his task, even at the risk of his own life. "The post of honor," says Carlyle, "is the post of difficulty, the post of danger—of death, if difficulty be not overcome;" and the honorable man, sooner than desert that post, is ready to say, with Addison, "Better to die ten thousand deaths than wound my honor."

A high conception of honor makes a man do more than the careless world expects of him. It makes a Walter Scott or a Mark Twain, for instance, labor loyally for years to discharge the claims of creditors when a business venture meets with disaster. It enables a man to resist the temptation to accumulate money by dishonest methods, or secure an advantage of any kind through means which conflict with his ideas of what is honorable.

It is a keen sense of honor that makes people tell the truth when a falsehood would save them from a disagreeable situation; that keeps them faithful to their work when there is no one near to watch, or when their neglect would never be discovered. The honor strong enough to withstand a temptation that whispers "No one will ever be the wiser," is an honor which has been put to the supreme test. Says a poet:

what thy manhood bids thee do;
rom none but self expect applause;
noblest lives and noblest dies
Who makes and keeps his self-made laws.

tivating the Sense of Honor. Children e educated to be honorable in all their s and to consider themselves disgraced ything that is mean or cowardly. They l early be taught the lesson that a lie ors them, that breaking a promise is lent to lying, that violating a confidence loyal.

y should be trained to regard a neglected s something dishonorable. The first step ucating children to fidelity in the per-nce of their duties is to hold them re-ble for certain simple home tasks, mak-; plain that they are being trusted to e work, and then praising them warmly ithfulness and promptness. Such respon-y and confidence, linked with apprecia-are as flattering and stimulating to chil-s to older folks. By following this plan the boy or girl who is naturally careless ndependable can be "trusted" into a sense of honor regarding any work that lertaken. It is as George Eliot wrote—e who trust us educate us."

re and more the "honor system" which ade such excellent records for itself in reform work is being put into practice e general educational process. Parents eachers are coming to see that it pays to l to the child's honor—that the child ds more quickly to trust than to on. The boy who is put "on his honor" cheat in an examination and then freed distasteful policing as he prepares his ; the girl who at home is "bound in " to speak the truth on all occasions and statements are accepted without ques-the pupil who is intrusted with school rsonal property and made to feel the con-e that is thereby reposed in him—all re receiving practical, everyday lessons in . Knowing that they are being implicitly d, that there is no danger of being found nd punished, they are ashamed to do the norable things which, under the old plan spicion and supervision, might not have d them a moment's hesitation or worry. indeed, is the saying of George Mac-ld, that "to be trusted is a greater com-nt than to be loved."

e boy whose early education has laid such ndation in honor is in a fair way to develop into the sort of man to whom the "graft" that pollutes our business and political life stands as a thing unclean; who will neither sell his vote, bargain for favor, scamp his work nor resort to petty trickery and deceit to gain success. He will set too much store by his "honor bright" to be willing to stain it in the slime of corrupt methods. L.M.B.

Outline on Honor

Motto:

"Come what will, I will keep my faith with friend and foe."—Lincoln.

Essay on Honor:

(a) The bigness of the term
(b) Requirements of personal honor
(c) Official honor and its obligations
(d) What "national honor" means

Biography:

Cicero	Thomas Jefferson
Mark Twain	John Bright
Sir Walter Scott	Abraham Lincoln
Thomas Babington Macaulay	Benjamin Franklin
	Jefferson Davis
William Penn	Alexander Mackenzie
George Washington	

Poems to Memorize:

Speech of Polonius to Laertes—Shakespeare's *Hamlet*
The Lost Leader—Robert Browning
A Short Sermon—Alice Cary

Supplementary Reading:

Regulus—Thomas Dale
Story of *Damon and Pythias*
The Pied Piper of Hamelin—Browning

Quotations:

A hundred years cannot repair a moment's loss of honor. —Proverb.

A thread will tie an honest man better than a rope will do a rogue. —Scotch saying.

Honor is like an island, rugged and without shores; we can never reënter it once we are on the outside. —Boileau.

The air for the wing of the sparrow,
The nest for the robin and wren;
But always the path that is narrow
And straight for the children of men.
—Alice Cary.

A brave man hazards his life but not his conscience. —Proverb.

Not gold, but only men can make
A people great and strong;
Men who, for Truth and Honor's sake,
Stand fast and suffer wrong.
—Emerson.

Be true to your word, your work, and your friend.

Our friends see the best in us, and by that very fact call forth the best from us. —Black.

To thine own self be true,
And it must follow as the night the day,
Thou canst not then be false to any man.
—Shakespeare.

A man dishonored is worse than dead.
—Cervantes.

God give us men! A time like this demands
Strong minds, great hearts, true faith, and ready hands;
Men whom the lust of office does not kill;
Men whom the spoils of office cannot buy;
Men who possess opinions and a will;
Men who have honor—men who will not lie.
—J. G. HOLLAND.

HOOD, JOHN BELL (1831-1879), an American soldier, born in Owingsville, Ky. He was graduated from West Point in 1853, then served in the United States army until the outbreak of the War of Secession, when he joined the Confederate forces. His bravery in the Virginia campaigns during the first years of the war secured rapid promotion. He commanded a division of Lee's army at Antietam and at Gettysburg and led a brigade under General Bragg at Chickamauga, where he lost a leg. Afterwards he became lieutenant-general and served in the Atlanta campaign under General Johnston, whom he succeeded in command of the army opposing General Sherman in Georgia. Abandoning the defensive policy of his predecessor, he vigorously attacked Sherman, was repulsed with severe losses and compelled to retire from Atlanta. He was again defeated at Franklin, Tenn., but moved on to Nashville, where, on December 16, 1864, he was routed by General Thomas. At his own request he was then relieved of his command. At the close of the war he became a commission merchant in New Orleans. He was the author of *Advance and Retreat,* a book detailing his experiences in the United States and Confederate armies.

HOOD, MOUNT, an extinct volcano in the Cascade Range in the northern part of the state of Oregon, and about fifty miles south of the Columbia River. It rises to a height of nearly 12,000 feet, and has many glaciers on its slopes and some high precipices. It was last active in 1875. A magnificent view of the surrounding country is obtained from the summit, which is easily reached by good climbers.

HOOD, ROBIN. See ROBIN HOOD.

HOOD, THOMAS (1799-1845), an English poet and humorist, whose best-known poems, *Song of the Shirt* and *The Bridge of Sighs,* are among the most perfect expressions of love and pity for suffering humanity that can be found in English literature. Hood began his literary career by writing articles for a local paper and a magazine in Dundee, and in 1821 became assistant editor of the *London Magazine,* on the staff of which were also Charles Lamb, William Hazlitt and Thomas De Quincey. Nine years later he began the publication of the *Comic Annual,* for which he wrote some of his most humorous productions. This was succeeded, in 1838, by a monthly periodical called *Hood's Own.*

In his fondness for punning Hood sometimes went to extremes, but when he is at his best his writings show an admirable blending of humor and pathos. Shortly before his death he established *Hood's Magazine.* It was in his last illness that he wrote his imperishable *Bridge of Sighs* and *Song of the Shirt.* Among other writings are the remarkable poem, *Dream of Eugene Aram; Tylney Hall,* a novel; *National Tales,* a collection of short stories; and *Whims and Oddities.*

HOOKER, JOSEPH (1814-1879), an American soldier popularly known as FIGHTING JOE, on account of his daring and his soldierly qualities. After graduating from West Point in 1837, he joined the artillery and served in Florida and on the Maine frontier from 1837 to 1840. During the Mexican War he displayed conspicuous gallantry and was successively advanced to the rank of captain, major and lieutenant-colonel. In 1853 he retired from the army and devoted his attention to farming and civil engineering.

When the War of Secession began he was appointed brigadier-general of volunteers, and major-general in the following spring. During the Peninsula Campaign, at South Mountain and at Antietam he fought with distinction, and in 1863 was placed in command of the Army of the Potomac. While his personal courage was remarkable, he failed to meet the requirements of a commander of a large body of troops. At Chancellorsville, May 2 to 4, 1863, he met with a crushing defeat which critics say was entirely due to his inability to meet emergencies and make quick decisions. He was succeeded in command by General Meade, but he later distinguished himself in the "Battle above the Clouds" (Lookout Mountain), while fighting under Rosecrans. In recognition of his services in that struggle he received the rank of major-general in the regular army. Joining Sher-

JOSEPH HOOKER

e again distinguished himself in the
on Atlanta. In 1864 he was relieved
and, and after taking charge of several
epartments retired from service in 1868.

ER, MOUNT, one of the highest eleva-
the Rocky Mountain range in Canada,
boundary between the provinces of
and British Columbia. Mount Hooker,
with a nearby peak, Mount Brown,
reported by David Douglass, an Eng-
anist, when he traveled through that
in 1826. Hooker was named for two
n-climbing scientists of the party. The
n rises to a height of 10,505 feet, but
time, before accurate measurements
ten, it was supposed to be over 15,000
h. The mountains in its vicinity in
Columbia contain gold, lead, copper,
id coal.

'WORM, a parasite found in dirty
r mud, which attaches itself to the
legs of persons wading or walking in
lly penetrates the skin and is carried
blood to the lungs. From the lungs it
with the mucus which is always pres-
finds its way into the throat or mouth,
then swallowed, finally finding lodg-
in the small intestines. By means of
rom which its name is derived, it at-
itself to the mucous membrane and
lood and nourishment from the sur-
g tissues. It may also be swallowed
lean vegetables which are eaten raw, or
ty water.

toms. Loss of weight and strength,
ale, watery condition of the blood, are
nt symptoms. The presence of the eggs
ookworm in the bowel discharges make
ence certain. Its usual permanent loca-
the upper part of the small intestine,
occasionally it may find its way to the
or the lungs, there finding lodgment.
ymptoms are abdominal pain, loss of
, alternating diarrhoea and constipation,
ive weakness, followed by dropsy and

ment. Under the watchful eye of the
n the use of thymol has been found to
hookworm, a preceding fasting and
treatment being necessary. To lessen
ase, if not entirely to prevent it, water
king should be boiled or well filtered,
les should be thoroughly clean, and
should refrain from walking barefooted
or mud in localities where hookworm
a to be prevalent.

Where Found. The hookworm has a wide distribution in tropical and subtropical countries of America, but properly inhabits the older-settled hemisphere, Southern Europe, (Italy, Austria and Switzerland) and the regions of the Mediterranean on Asiatic as well as African shores. Occasionally an imported case is found in some seaport of the United States. S.C.B.

Consult pamphlets issued by the Public Health Service of the United States Department of the Interior, as *Report on the Prevalence and Geographic Distribution of Hookworm Disease; Hookworm Disease: Its Nature and Prevention.*

HOOPOE, *hoo'poo,* a bird related to the kingfisher and hornbill, widely distributed throughout the warmer parts of Europe, Asia and Africa. The best-known species is the common hoopoe of Europe, which is about twelve inches long, with a slender, sharp bill and a crest formed of two parallel rows of feathers which it can erect at will. Its general color is buff, with black and white markings on wings and tail. It feeds on insects and makes its nest in a hole in a tree or wall; its eggs are white. Another species, found only in South Africa, is called the *wood-hoopoe;* it has glossy black plumage, a long, tapering tail and no crest. It is a noisy, restless bird, and, like the true hoopoe, emits a strong, disagreeable odor.

THE HOOPOE

HOOSAC, *hoo'sak,* **TUNNEL,** the longest tunnel in America, nearly five miles in length, piercing the Hoosac Mountain in Massachusetts. It was constructed for the Boston & Maine Railroad; it is 137 miles from Boston and fifty-four miles from Troy, N. Y. Experimental work on it was undertaken in 1851; active tunneling was commenced in 1856 and was completed in 1873. The tunnel contains two tracks, is twenty-four feet wide and twenty-two feet eight inches in height. Work was commenced at the same time at both ends and also from a shaft sunk to a depth of 1,028 feet in the center. This shaft is now used for ventilation and affords a good supply of fresh air.

The boring of the tunnel was a difficult undertaking, as the rock penetrated was chiefly schist. The total cost was about $11,000,000.

HOPE, ANTHONY. See HAWKINS, ANTHONY HOPE.

HOPI, *ho'pe,* or **MOKI,** *mo'ke,* an interesting and once powerful tribe of North American Indians, about 2,000 of whom are now living in Northeastern Arizona. There, hundreds of feet above the desert, on *mesas,* or rock "tables," reached by steps and difficult trails, they have their terraced stone *pueblos,* or villages. Of the seven villages which they occupy, Walpi and Oraibi are the principal ones. Another town, called Hano, is inhabited by the *Tewa,* a similar tribe, who came from Mexico two centuries ago.

The Hopi are a small, muscular and agile people. They have reddish-brown skin, slanting eyes, broad, straight noses and large mouths. Like all Indians, they have straight, black hair. Hopi men sometimes wear their hair "banged" in front, cut short at the sides, and tied in a knot behind. They now wear calico shirts, short pantaloons, leggings, moccasins, hair bands, and jewelry of shell, turquoise and silver. Married women wear their hair in two coils hanging down in front; girls on reaching the marriageable age, at about fourteen, dress theirs in whorls at the sides of the head. All of the women wear dark-blue woolen dresses of native weave, fastened with embroid-

HOPI MAN AND MAIDEN

ered belts, also calico shawls draped over the shoulders, deerskin moccasins, and various pieces of silver jewelry. Many of the younger women are really pretty.

The Hopi are keen, industrious and peace-loving, and lead upright lives. Their language is Shoshonean. They are skilled in pottery and basket making, weaving, dyeing and embroidering, and articles which they make find a ready market among neighboring tribes and among tourists. They raise large quantities of maize, and store about a third of the crop each year against possible future needs. Peaches, beans, melons, pumpkins, cotton, wheat and tobacco are also cultivated by them. Flocks of sheep and goats supply their wool and skins, and cattle, horses, burros and mules are among their possessions.

Like the other Pueblo Indians, the people of this tribe believe in witchcraft, and many of their customs and ceremonies are strange and interesting. Their snake dance is an especially

AN OLD HOPI PUEBLO, OR VILLAGE

weird performance, the Indians dancing with live snakes between their teeth. The Hopi first became known to white men in 1540. Studies made of mounds and ruins show that at one time villages of the Hopi extended as far north as the Colorado River, west to the vicinity of Flagstaff, Ariz., and south to the little Colorado Valley and probably beyond. M.S.

HOPKINS, MARK (1802-1887), the revered president of Williams College for thirty-six years, of whom President Garfield, who was at one time his pupil, said, "A log with a student at one end and Mark Hopkins at the other is my ideal college." He was born at Stockbridge, Mass., and after graduating from the college of which he afterwards became president, he studied medicine and practiced the profession for a short time in New York City. In 1830 he became professor of moral philosophy at Williams College, and six years later was chosen its president. In this position he did much to build up the prestige of the institution and to develop the individual student, and won for himself a place as one of the leading educators of his day. In 1857 he became president of the American Board of Foreign Missions, acting in this capacity for nearly thirty years. After resigning as president in 1872 he remained pastor of the college church, where he was an in-

WORLD BOOK

HOPI MAN AND WIFE.

Present-day members of the tribe at characteristic occupations. She is making baskets; he

preacher. He published *The Influence Gospel in Liberalizing the Mind, The es of Christianity, The Law of Love e as a Law* and *The Scriptural Idea of*

KINSON, JOSEPH (1770-1842), an n jurist, remembered chiefly as the of the patriotic song, *Hail Columbia.* born in Philadelphia, studied at the ity of Pennsylvania and built up a large ctice in his native city. He acted as in some of the most important cases of , notably for Judge Chase when he was n impeachment charges in the Senate. he was elected to the House of Repre- es, and from 1828 to his death he was ict judge. His well-known song was in 1798.

KINSVILLE, KY., an important to- narket and the county seat of Christian , situated in the southwestern part of te, about twenty-four miles from the n state line and on the Little River; ille, Ind., is eighty-four miles northwest, lle, Tenn., is seventy-one miles south- d Henderson, Ky., is seventy-four miles The city is served by the Louisville & lle Railway, constructed to the city in he Illinois Central, built to this point in nd the Tennessee Central, built in 1899.) the population was 9,419; it had in- to 10,762 in 1916, by Federal estimate. percentage of this number are negroes. ea of the city is nearly four square

gh Hopkinsville is principally interested cultivation and preparation of tobacco market, it has a considerable trade in gricultural products and in coal, live nd dairy products. The manufactures flour, wagons, lumber and brick. The s a $90,000 Federal building, a $15,000 ie Library, a $100,000 high school build- $40,000 Memorial Hospital, and the n Kentucky Insane Asylum. Bethel Fe- ollege (Baptist) and McLean College are here.

original name of the city was Elizabeth- This was changed to the present name or of Samuel Hopkins, pioneer, soldier atesman, when the place became the seat of Christian County in 1797. Dur- War of Secession it was partly destroyed The city was incorporated in 1798, and 5 it adopted the commission form of ment. J.W.R.

HOPS, as cultivated, are tall, perennial vines, dying to the ground each fall, and making a new growth of thirty feet or more each season. The hop is closely related to hemp, both belonging to the nettle family. Like hemp, it has male and female plants; the female plant bears the seed catkins that are of value commercially. Ordinarily little or no seed is produced, the catkin being made up of large leaf and flower clusters called bracts; at the base of the bracts is a yellow, resin-like material called *lupulin,* and it is this substance that gives value to hops.

Hops are propagated by cuttings, six or eight inches long, from the large, fleshy roots. Several pieces are planted in each hill and the hills are usually seven feet apart each way. In each hill is set a pole about twenty feet high, to support the vines, though in some places a trellis of wire and string is used instead of

HOPS

Below, at left: Training young vines on poles. At right: Fully-matured vines.

poles. By September, when the hops are ready to pick, the poles are taken down and the hops are picked off by hand. They are then cured and packed in large bales for market, where they are used principally in the manufacture of beer. They add flavor to this drink and retard certain undesirable ferments, while favoring the growth of desirable yeasts. For al-

most a thousand years this has been the chief value of hops in the commercial world.

Production in the United States. Hops are grown principally in Europe and the United

PRINCIPAL HOP-GROWING SECTIONS

States. In the latter country the crop comes most largely from Oregon, New York, California and Washington, in the order named. These four states grow 97 per cent of the entire yield of the United States, amounting to 45,000,000 pounds, valued at over $7,800,000 to the growers. Canada exports about $25,000 worth of hops to England every year, and supplies nearly all of its home demands.

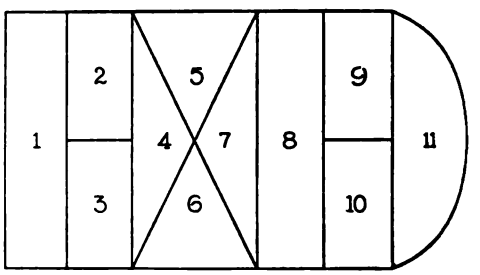
Yield Per Acre, and Prices. The average yield of hops is usually between 700 and 800 pounds per acre in the United States and about 500 pounds in Europe. On the Pacific Coast the average is from 1,000 to 1,500 pounds per acre, but yields of one ton per acre are often secured. Oregon produces more than any other state of the Union.

The price fluctuates more than that of any other crop. It has varied from 6 cents to $1.13 per pound, and often varies through half this range in any period of ten years. The average cost of production is estimated at from seven to ten cents per pound. E.G.M.

Consult publications on hop cultivation issued by the United States Department of Agriculture, which may be had on application; Myrick's *The Hop, Its Culture and Cure.*

HOPSCOTCH, a children's game which requires considerable agility and serves to develop poise and muscular control. It is played on a court chalked on the pavement or scratched—scotched—on the ground. The court, which is about twenty-five feet long and five or six feet wide, is divided into a number of compartments, as shown in the illustration. As most commonly played, the player stands at *taw,* a short distance behind the court, and tosses a flat pebble or bit of broken pottery into the first division. Hopping into that division, he picks up the pebble and hops out again. He then tosses the pebble into the left half of the second compartment, hops through the two compartments (1 and 2 in illustration), picks up the pebble and hops out again.

The pebble is next thrown into the right half of the second compartment (3 in illustration),



HOPSCOTCH COURT

and the player hops through 1, 2 and 3 and out again. When he throws the pebble into 4, he hops into 1, then straddles the line separating 2 and 3, and then hops into 4 and back again. When he hops to 7 he straddles at 5 and 6, and so on. The player who first gets the pebble into 11 and hops through all compartments without making a mistake wins the game. It is counted an error to step on a line, to lose one's balance, or to throw the pebble on a line or outside the compartment aimed for.

In another form of the game the pebble is kicked outside the court instead of being picked up. W.C.

HOQUIAM, *ho'kwiam,* WASH., a city in Chehalis County, on Gray's Harbor, ninety miles by rail southwest of Tacoma. It has an excellent harbor and is on the Chicago, Milwaukee & Saint Paul, the Northern Pacific and the Oregon-Washington Railroad & Navigation Company systems. Hoquiam is near extensive tracts of pine, and it ships lumber and lumber products, salmon, canned sea clams and furs. There are large lumber and shingle mills and shipyards here, and the city has a Carnegie Library and a high school building. The commission form of government was adopted in 1911. In 1910 the population was 8,171; in 1916 a Federal estimate gave it 11,666. The area is about six square miles.

ACE, *hor'as,* or QUINTUS HORATIUS
ıs (65-8 B.C.), one of the greatest and
t of the Latin poets, was born at Venusia,
ıthern Italy. At an early age he was
to Rome, where he began his education;
ıe removed to Athens and took up the
of philosophy. After the assassination
lius Caesar in 44 B.C., Brutus visited
s to secure recruits for his opposition to
wers in Rome. Horace, although without
y experience, joined the army, was made
officer and served in the Philippi cam-

On the defeat and suicide of Brutus,
e returned to Rome, found employment
lerk and began to write verse.
ɔugh his friend, the poet Virgil, he met
nas, the patron of Roman art and letters,
ıowed his appreciation of Horace by pre-
g him with an estate in the Sabine Hills
ıfficient income to maintain him. There
et lived in seclusion and devoted himself
rature. His works consist of two books
istles, the last of which, *The Art of*
, was left unfinished; four books of
one book of *Epodes,* or short poems, and
lar hymn written at the request of the
ror Augustus. Horace is said to have
ıot only the first but practically the only
ɔoet of Rome. His writings are distin-
d for their genial satire and stateliness
ignity of expression. As an important
ı of the classics, they are read by ad-
l college students in their Latin courses.

ATIUS, *ho ra'shi us,* a legendary hero
defense of the bridge across the Tiber
is immortalized in Macaulay's *Lays of*
ıt Rome. The invading Etruscan army,
story runs, had almost reached Rome
the citizens realized their danger. To
y the bridge before the arrival of the
seemed impossible till Horatius with
hers volunteered to guard its approaches:

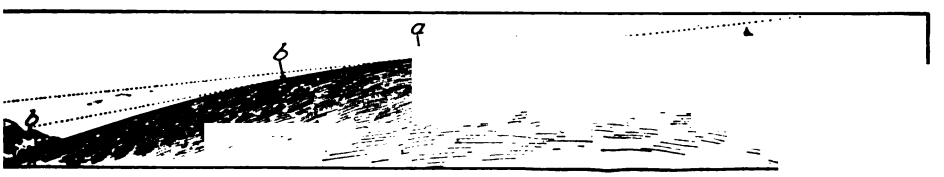
"And straight against that great array
Forth went the dauntless Three,
For Romans in Rome's quarrel
Spared neither land nor gold,
Nor son nor wife, nor limb nor life,
In the brave days of old."

The ancient custom, by which the champions of each army met in single combat before the clash of the hosts, made it possible for the three Romans to hold back the Etruscans until the citizens, rich and poor together, had chopped the supports of the bridge. Horatius, though heavily armed and wounded, swam the rushing Tiber to safety. The date 508 B.C. is given to Horatius' exploit by those who believe the legend to have an historical basis. Some authorities consider the story to be merely a good piece of imaginative writing.

HORE'HOUND, the popular name of several plants of the mint family. The common, or white, horehound grows in waste places and by roadsides, is found throughout Europe and Northern Asia and is naturalized in America. The plant is from one to one and one-half feet high and has a whitish appearance, due to the cottony white hairs with which it is covered. The flowers are small and almost white. The odor is aromatic, and the taste is bitter. It is prepared for use as a medicine, principally for the relief of coughs and throat troubles, and for mild cases in the favorite form of horehound candy. The black, or fetid, horehound, is an English variety, which closely resembles the white species in taste and possesses similar medicinal properties.

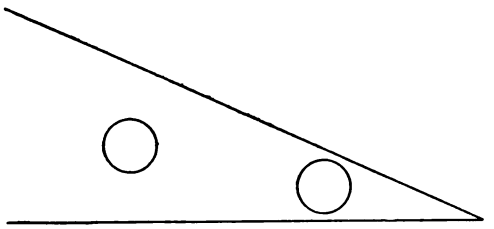
HORIZON, *ho ri'zun,* a word from the Greek *horos,* meaning *boundary,* which in popular language is applied to the circular line where the earth and sky, or sea and sky, seem to meet. Because of the curvature of the earth's surface the horizon line appears nearer to the eye when the observer is close to the ground than when he is on a height. For instance, a person on a mountain one mile high can see ninety-six miles, but if he should gaze out over the ocean with his eyes only about four feet higher than the water, his horizon would be only two and one-half miles distant.

In the accompanying diagram the dotted lines show the lines of vision for an observer standing at *a* and at *b; a* on the dotted line shows his horizon when he is at the point *a,* and *b* when he is at the point *b.*



THE HORIZON
The details of the illustration are explained in the text.

Why Does the Moon Look Larger at the Horizon? The following explanation was recently given for this interesting phenomenon by Dr. Ponzo, an Italian psychologist: If two equal circles be drawn in the interior of an angle, the one nearest the apex will always appear the larger because the sides of the angle



THE MOON AND THE HORIZON

are nearer to it. For the same reason the moon is apparently enlarged at the horizon. That is, it presents itself on the horizon in the angle formed by the earth and the declining arc of the sky, while in the center of the heavens it is free in the vast area of the heavens.

HORN, one of the most important of the brass instruments used in orchestral and band music, the peculiar and soft tone of which is due to the length of the tube, the shape of the bell and the funnel-like bore of the mouthpiece. Among primitive races the original horn was made of conch-shell or elephant tusk, and was utilized in war and the chase. In medieval times it took the form of a bugle, also for hunting purposes, and from its crude form all modern horns have been developed.

Horns are divided into three groups: the simple horn used by fox-hunters for signaling, which has no musical value; the saxhorn, for military and brass bands; and the orchestral, or French, horn, the most refined and delicate instrument of all. The French horn has been improved by the addition of valves, which give to the instrument a greater variety in pitch and quality. Music for the horn is written in the key of C and an octave higher than it is played, although by adjusting the length of the tube it can be played in almost any key. The horn has a compass of about three octaves; it is seldom used singly, either two or four being the usual number in an orchestra. Handel, Mozart, Beethoven, Schubert, Weber, Mendelssohn, Schumann—in fact, all composers of note—have given horns a significant place in their compositions.

HORN, a tough, hardened, partly transparent substance, developed from the outer layer of skin, or epidermis, and represented by the *nails* on the toes and fingers of man and other animals, by the *beaks* and *claws* of birds, the *hoofs* of horses and cattle, the *shell* of the tortoise and the tapering appendages which grow from the head of deer, cattle, sheep and goats. These latter are known as *horns.*

Whalebone, developed from the palate of certain species of whale, the hard spots on the knees of the camel, the corns on the toes of human beings, the hide of the scaly anteater and the scales of serpents and lizards are other examples of horn. Chemical analyses of this substance show that it is composed of carbon, hydrogen, nitrogen, oxygen and sulphur, carbon being usually present in the proportion of over fifty per cent. The purpose of horn is to furnish a protective surface, a tool or a weapon of defense.

There are interesting points of difference in connection with the horns of various animals. Those of the deer consist at first of bone core covered by flesh and a velvety skin; their horns are expanded and branched into antlers, which fall off at regular intervals (see DEER). The horns of the giraffe are independent bones with a covering of hairy skin; those of oxen, sheep and antelopes consist of a bony core covered by a horny sheath, and are outgrowths of the frontal bone. The horns of oxen, sheep, goats and antelopes are never shed, except in the case of the pronghorn antelope.

Economic Uses of Horn. Because of its toughness and pliability and since it can be softened by heat and molded, horn lends itself to the manufacture of many useful and ornamental articles. It is widely used to make combs, handles for umbrellas and knives and forks, buttons, drinking cups and many varieties of boxes. From the solid parts of the buffalo horns, beautiful carvings were formerly made. Horn takes dyes admirably, and through a skilful manipulation of colors common varieties can be made to resemble costly tortoise shell. The early use of horn for making musical instruments and fog signals has given the name horn to these articles. Powder horns, too, before the advent of cartridges, were spoken of by that name long after they ceased to be made of horn.

HORN, a famous cape which is the southern extremity of an island of the same name, forming the most southerly point of South America. It is a dark, steep headland, 800 to 600 feet high, running far into the sea. The first man to "round the Horn" was a Dutch sailor named Hoorn; he accomplished the feat

16, and his name was given to the head- in time the name was changed to *Horn.* climate is Antarctic, and the region is ıy; "rounding the Horn" is an experience ed by mariners for three hundred years. e days before steam vessels were known, sage around the Horn in a sailing vessel rred distinction on a sailor for having l the utmost danger that one can be called to face on the seas. The Panama Canal diverts nearly all the boats which for- r sailed around the southern end of the nent.

RN'BILL, a family of large, ungainly , native to Africa and East India. They immense horny bills, and above them us horny growths called *casques,* or hel- the shape of which varies in different es. The bill, which frequently has saw- edges, is very large at the base, much d, and is pointed at the end. The largest ese birds are five feet long from head to The characteristic colors of the plumage lack and white; the neck is without feath- nd the bill is yellow, often marked with ınd black.

e hornbills are usually to be found in or groups of six or eight, and they live e treetops except for flights to the ground erries, fruits and insects. The larger birds levour snakes. They have a curious habit ssing the food particles in the air and ing them in the bill as they fall. The is made in a large hollow in a tree, and the female begins to sit on her eggs, this is almost entirely closed in by a mud er made by the birds. Through one small ng the mother bird receives her food dur- ne nesting season from the bill of the male. to four large, white eggs are laid.

rnbills have an extremely harsh note, thing between a bray and a hiss. Many es are regarded superstitiously by the na- of the countries they inhabit.

RNBLENDE, *horn'blend,* also called AM- LE, is a mineral which occurs in a num- f different forms and a great variety of s. Common hornblende is usually black rk green. It is frequently found in crys- esembling four-sided rocks. It also occurs ıall flakes resembling mica, but the flakes ıt be separated as in mica, and can ly be cut with a knife. In this form lende replaces mica in granite (which

Some of the most beautiful cabinet nens are varieties of hornblende, since it frequently is cut in needlelike crystals which are arranged in a great variety of patterns. When iron is present these crystals are of a beautiful green color. In some specimens they are pure white and look like satin, then again they may be of various shades of red. Asbestos (which see) is closely related to hornblende, as is another peculiar mineral called *mountain leather.* Hornblende is composed chiefly of magnesia, silica and alumina.

HORNED TOAD, *hornd tohd,* known also as HORNED LIZARD and CALIFORNIA TOAD, is a lizard native to North America, found from Northern New Mexico to California and southward. This animal is toadlike in appearance, about five inches long, and the scales covering its

THE HORNED TOAD

body bear sharp, horny spines. It inhabits sandy places, on the plains as well as in the mountains, remains in hiding throughout the day and comes forth at night in search of beetles and other sand-haunting insects, upon which it feeds. Horned toads are harmless; they never bite, even when taken in the hand. As a means of defense, they have a habit of spurting little jets of blood alternately from each eye when disturbed. There are about ten species of this genus of lizards.

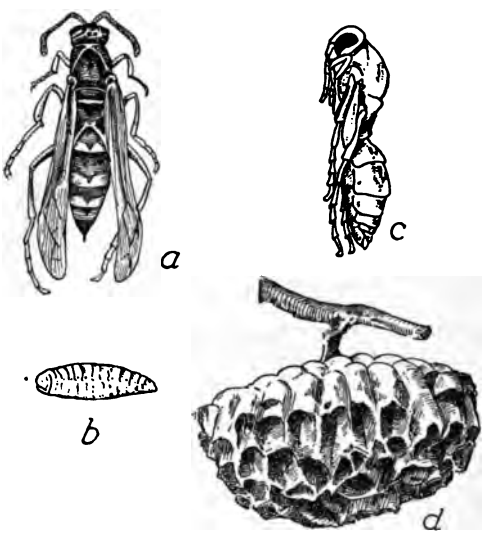
HORNELL', N. Y., a center of silk manufacture, situated in Steuben County, in the southwestern part of the state. It is ninety-three miles southeast of Buffalo, sixty miles northwest of Elmira and seventy-two miles south of Rochester, on the Canisteo River and on the Erie & Pittsburgh and the Shawmut & Northern railroads. The population, including a number of Italians and French, was 13,617 in 1910, and 14,685 in 1916, by Federal estimate.

Hornell contains Saint Ann's Academy, Saint James Mercy Hospital, the Steuben Sanitarium, a public library, county courthouse, and a Federal building, the latter erected in 1916 at a cost of $85,000. The important industrial enterprises include car shops and manufactories of silk goods (especially silk gloves), sash, doors and blinds, leather, furniture, shoes,

white goods, foundry and machine-shop products and brick and tile.

The first settlement was made in 1790. The place was called Upper Canisteo until 1820, when it was named Hornellsville, in honor of Judge George Hornell. It was incorporated as a village in 1852 and chartered as a city in 1888. The name was changed to Hornell in 1906 by act of the state legislature.

HORNET, *hawr'net,* an insect larger and stronger than the ordinary wasp, but resembling it in most respects. It is represented in the United States and Canada, especially in the New England states and Ontario, by a



PERTAINING TO THE HORNET
(*a*) The mature insect; (*b*) larva; (*c*) pupa; (*d*) nest, much reduced in size.

large species known as the *white-faced hornet.* This insect is about an inch in length and is brown or brownish-red, with some yellow on the wings, head and abdomen. The hornets lick the sap of trees, are fond of the nectar of flowers, and they are particularly partial to ripe, sweet fruits and honey. They also prey upon other insects.

Hornets live in colonies of males, females and workers, and there are usually over two hundred individuals in a colony. All of one colony are the offspring of a single female, which, having survived the winter in some sheltered hiding place, has laid the foundation of her nest in the spring. Their nests, composed of coarse, papery material from bark of trees, are built in hollow trees, in the crevices of walls and upon the limbs of trees. Hornets are easily irritated, and all species are able with their stings to inflict painful wounds, which are generally accompanied by considerable swelling. See WASP.

Consult Howard's *Insect Book;* Kellogg's *American Insects.*

HOROSCOPE, *hor'o skope,* a word derived from the Greek *horoskopos,* meaning *one who observes the hour.* In astrology it was used to signify the disposition of the stars in the heavens at a certain time. Astrologers "cast a horoscope" by ascertaining what stars were in the ascendant, or rising in the east, at the time of the birth of any particular person. From the position of the stars they calculated their influence and told the fortunes of inquirers. Such fortune-telling has been proven to be altogether unreliable.

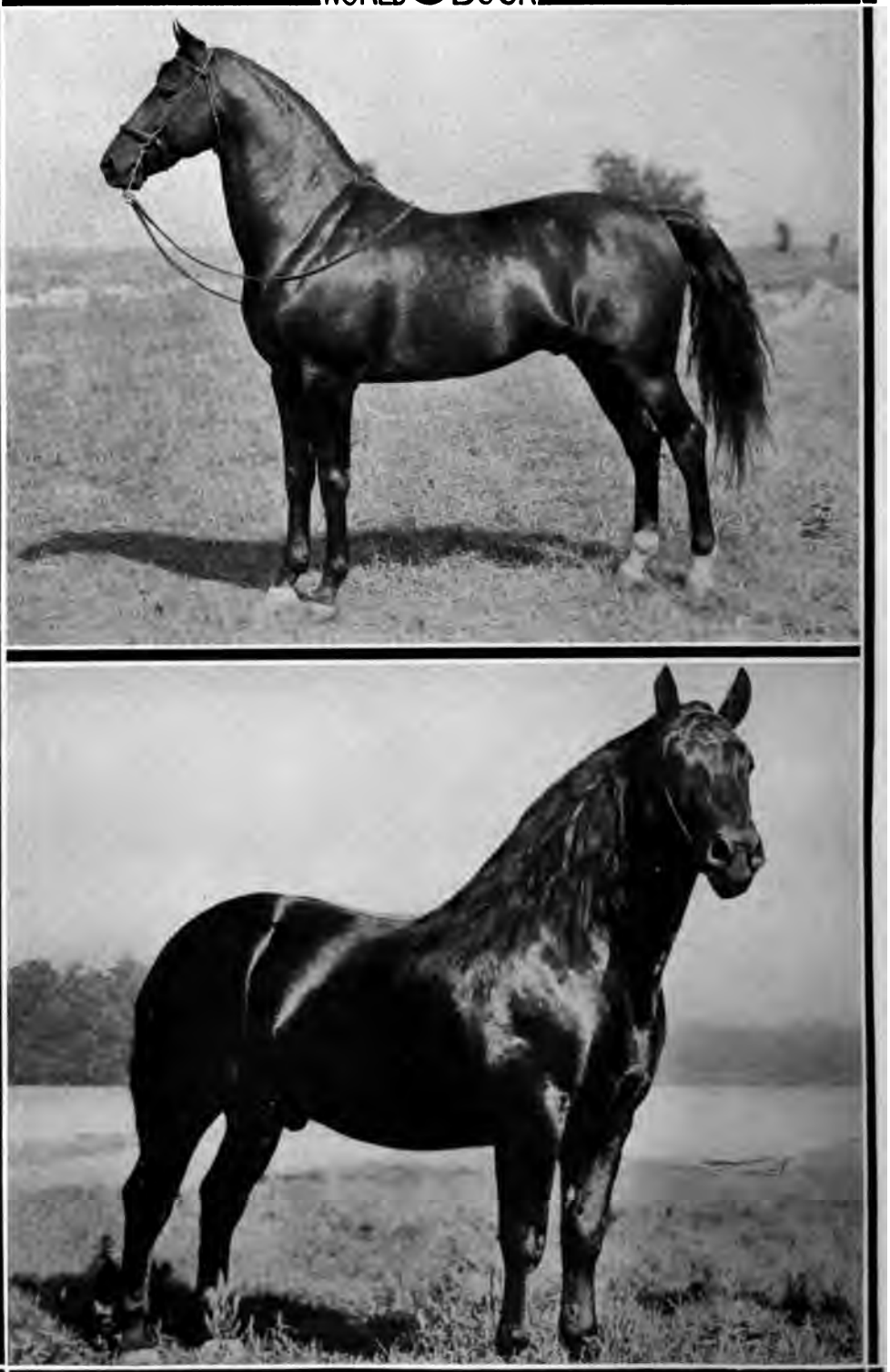
HORSE, a mammal which has been domesticated for thousands of years and, next to cattle, the most important domestic animal in western civilization. It is distinguished for intelligence, fleetness and endurance. In the early history of the domestic horse, it was largely used for purposes of war, and references to it are made in legend and story of the past. Later it was pressed into other work, until finally it has become a beast of burden as well as the pet and companion of the civilized and uncivilized peoples of the world.

Much has been said and written concerning the continued usefulness of the horse and the effect of the great increase in automobiles on the numbers of horses and on the business of horse breeding. A study of the numbers of horses in the United States and Canada for the years 1910 to 1917 showed that the number of horses had increased somewhat and that the average price was as high as ever. There were in 1916 in round numbers 24,000,000 horses in the United States and 3,000,000 in Canada. Their average value was $103. There has been a decrease in the breeding of coach and carriage horses and that business has suffered, but the increase in the use of automobiles for transportation has just about taken care of the increase in business, and the demand for draft horses in cities is nearly as great as ever.

It is of interest to note the highest price ever paid for a horse. A thoroughbred, White Knight, brought in France $200,000. About fifty thoroughbred and standard-bred horses have been sold from time to time for $50,000 and above. Among draft horses, the highest price on record is $47,000 for the Clydesdale, Barron of Buchyvia.

BRED IN OLD KENTUCKY.

Above: Light driving type, standard-bred horse.
Below: French coach horse, harness type.



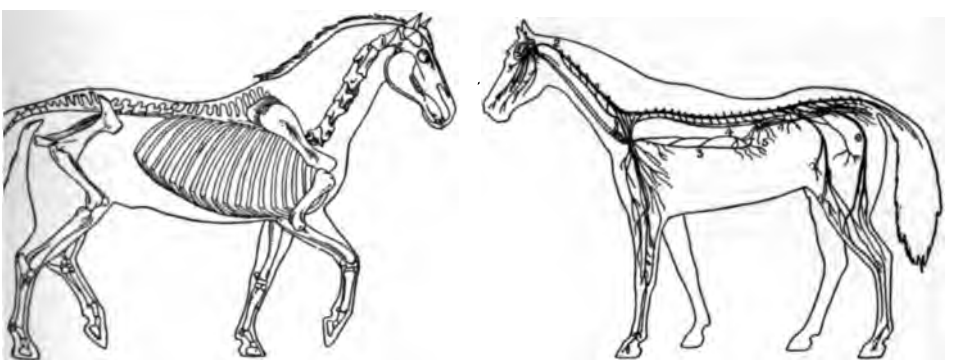
TWO FINE TYPES.

Above, first prize saddle horse, Illinois State Fair.
Below, nearly perfect Percheron heavy draft horse.

hile horses have been used mainly for la- their flesh is allowed to be sold for human mption in many countries in Europe and tly in America. The hide lends itself for s leather for covering base balls, the manu- re of gloves of the cheaper grades, for s and other uses of the same kind. Horse- does not stand long-continued wear as as does calfhide and cowhide.

telligence of the Horse. Man knows no faithful animal than the horse. Cen- s of training have developed it from a and even man-eating state until to-day in ligence it surpasses every other dumb ani- excepting the dog and the mule. Kind- it does not forget; injustice and injury it mbers. Its sense of direction and location en, and its power of vision unusual. A maturity at five years of age. They may be bred at two years, and may produce their colts at three. The period of gestation is eleven months. Theoretically, a mare should breed and produce a colt each year. In actual prac- tice the average number of colts produced is five or six in the lifetime of the mare. The mortality of colts is high, and a breeder is very successful if he gets fifty per cent of live colts from his mares each year.

The Prehistoric Animal. The history of the prehistoric horse is as well known as that of any other domestic animal. A type of animal existed which geological records show was the prehistoric ancestor of the modern horse; it was very small, with five toes on each foot. The first form of which there is any definite knowledge occurred in the early part of the



THE HORSE

t left, its skeleton. At right, its nervous system, with references as follows: (1) Brain; (2) l cord; (3) pneumogastric; (4) sympathetic system; (5) solar plexus; (6) sciatic.

will carry its burden safely on the dark- ight, if given free rein; it will return to ome if on the road control is withdrawn; nail collector's horse after a few trips will without suggestion from the driver at r collection box on his route. Will Carle- the poet, put in rhyme in *"Flash," The nan's Story,* the tale of the decrepit fire- e horse that was sold to a milkman; on morning trip the firebell rang and the of years asserted itself. The tale is not hrawn. A race horse seems to share his 's enthusiasm and to know that he is ted to distance his rivals. The family senses the innocence and defenselessness ildren and will tolerate from them what ght resent from adults.

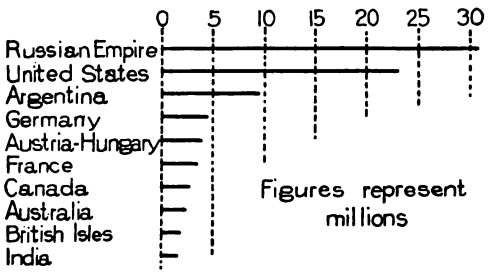
e average life of horses is somewhat un- twenty years; but instances have been n of horses living over forty years. Prob- they can be depended upon for hard until fifteen years old. Horses attain age of mammals. It had four toes on the forefoot and three toes on the hind foot, and from this form the horse has gradually in- creased in size and lost all except one toe on each foot, with vestiges of two other toes called splints. The present form of zebra, the wild ass of Asia, and Przewalski's horse, a wild pony found in Asia in 1881, are thought to be the connecting link between the prehistoric horse and the horse of modern times.

The prehistoric horse is known to have ex- isted in all parts of the world except Aus- tralia. The modern type was not found in America by early settlers, but it existed all over Europe and Asia. Improvements in the modern horse and its evolution into the types now known and used for domestic purposes have taken place in the last six hundred years. Previous to this time, the Arabian horse, which has had great influence in the improvement of the modern types of both light and heavy horses, existed. According to tradition, Ara-

bian horses can be traced to 1634 B.C. They have been imported into all countries in which the modern horse has reached its greatest development.

Principal Types. The three main types of the modern horse are the *roadster,* the *coach* and the *draft* types. These types are represented by distinct breeds, each of which has a more or less complete history. In addition to these main types may be mentioned the thoroughbred type, which has attained the greatest prominence in England in racing, the American saddle horse, and several breeds of ponies.

The *roadster,* or light-harness type of horse, is best represented by the American standard-bred, which may be either trotter or pacer. It is descended from the thoroughbred, which in turn traces back to an Arabian foundation. These horses are characterized by prominence of muscles and joints, leanness of body, and a general angularity of appearance not found in the coach or draft types. Quality, which



COUNTRIES OWNING THE MOST HORSES

is shown by refinement in the head and limbs and prominence in veins and muscles, is essential in the roadster.. The action of this type must be strong and true; it must be long, with the feet picked up with a snap and carried forward in a straight line. The feet are not raised high, consequently there is less knee and hock action than in the coach type. Standard-bred horses have reached their best development in America. Horses of this type vary in weight, since this is not necessarily a factor in their usefulness. They range in weight from 1,000 to 1,400 pounds.

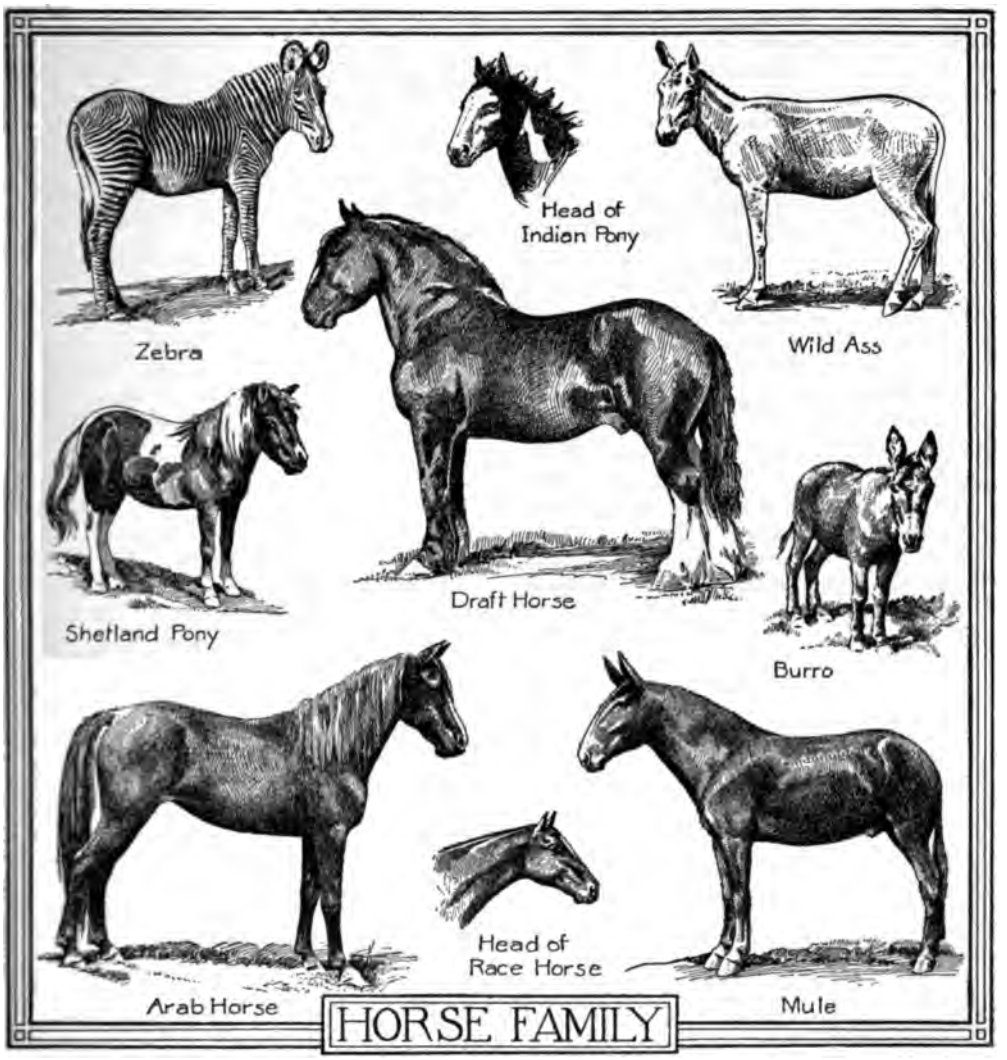
A light horse has been known to travel under saddle seventy miles in twenty-four hours, but it is not usual to drive more than thirty to forty miles per day. It is considered very good work when a cavalry troop covers thirty miles.

The *coach,* or *heavy harness,* horse, has been developed for the handling of heavier vehicles at a slower speed than is expected of the lighter driving type. The coach horse must be more showy in action, and consequently his gait has more knee and hock action and less speed. The body conformation is rounder, less angular, and more stylish than the driving type. The coach type is represented by the hackney, the French coach, the German coach and the Cleveland bay breeds of horses.

In the *draft* type the necessary qualification is weight, but style, action and good appearance have not been sacrificed in the production of draft horses carrying much weight. Light draft horses should weigh from 1,500 to 1,600 pounds, medium from 1,600 to 1,700, and the heavy from 1,700 pounds upward. Coarseness of bone and angular, rough joints are very undesirable in a draft horse. A horse is no better than his feet. Coarse bones and rough joints are often associated with poor feet and a coarse head and neck. The breeds representing this type of horse are the percherons of France, the Clydesdale of Scotland, the shire of England, the Belgian of Belgium and the Suffolk punch of England. All these breeds have attained prominence in North America and those other parts of the world needing a heavy horse type for draft purposes.

Care and Feeding of Horses. Horses respond to careful, intelligent care and treatment. There is a saying that a good grooming is worth a quart of oats any day. The horse should be kept in a well-bedded stall, in a clean, light, well-ventilated stable. If he can be blanketed, he will have a better appearing coat; a light blanket in summer will keep off the flies and add to his comfort.

The rations of horses are limited in all countries, practically, to the hays and the cereal grains. The kind of food varies with the locality. In the Eastern United States timothy hay and oats make up the favorite ration; further west, corn enters into the ration, with clover and alfalfa hay; on the Pacific slope rolled barley is used with hay from the wild oat and barley plants; in the south, corn is the chief grain feed, with the leaves of the corn plant for roughage. In other countries, rye and other cereals find favor. As an example, the following ration may be suggested for a draft horse weighing 1,500 pounds: sixteen pounds of mixed hay, timothy and clover, and sixteen pounds of mixed corn and oats ground together, half and half by weight. If the horse is at light work, the grain would be cut down and the hay increased.



For driving horses, timothy hay and oats are the favorite ration. The by-products in the milling processes that have found much favor in the feeding of sheep, dairy cattle and beef cattle have not been in favor with horsemen, with perhaps one exception—oil meal, the residue from flaxseed in the manufacture of linseed oil. This meal, fed at the rate of one pound a day, helps to keep the animal's coat smooth and the body in good working condition.

The stomach of the horse is small, and will hold about nineteen quarts. Theoretically to get the best digestion of grain, the horse should be fed some hay first, then his grain, and lastly more hay. This will not suit him, in that he will perhaps refuse to eat any hay and be impatient for his more palatable grain; to overcome the bad effects of this it is good practice to feed some moistened, chopped hay with the grain. A good system in feeding is to feed one-fourth of the grain ration in the morning with some hay, one-fourth at noon with what hay he has time to eat, and one half the grain ration with the rest of his hay at night. This gives the horse the most of his food when he has time to eat and digest it.

Much has been said and written concerning the watering of horses. It seems to be the best practice to water the horse, then feed him, and then allow him to drink again after eating. Theoretically, he should receive no water after eating, but in practice it seems best to give him some water then. A horse

may be watered when warm if due care is taken; the best practice is to let him have a swallow of water, then pull his head out of the trough, let him have another swallow and pull his head out again. Continue this practice until the most of his thirst has been quenched. The danger in watering a horse when he is hot comes not from the water, but because a large quantity of water striking his stomach at one time chills it or partially paralyzes it, resulting in acute trouble. A horse should have a chance to drink every five hours, or more often if convenient.

It will cost $75 to $125 per year to maintain a horse doing medium work. This will include feed and shoeing. The efficiency of a horse will of course depend on the length of his working day. Every owner of work horses should so plan his work that his teams do not stand idle at any season of the year.

DISEASES OF HORSES. Under their various headings in these volumes the following diseases of horses are treated:

Distemper	Heaves
Glanders	Spavin

Consult Johnstone's *The Horse Book;* Harper's *Management and Breeding of Horses;* Hayes' *Illustrated Horse Breaking;* Lydekker's *The Horse and Its Relatives.*

HORSE-CHESTNUT, a species of ornamental trees and shrubs, with showy white, yellow or red flowers and large, opposite, fan-shaped leaves. Many of these trees grow to heights of sixty to eighty feet, and are hardy, with the exception of the Californian and Himalayan species. They thrive best in moist, loamy soil. The seeds are large, brown and highly polished, and the bitter meats were at one time used as food for animals, particularly horses, from which fact the name was derived. The horse-chestnut is in no way allied to the sweet chestnut, except in name; it is more ornamental than useful. The several species found in North America are smaller than the true horse-chestnut, and their wood is of less value. See CHESTNUT.

HORSE FLY, also called GADFLY, an active, strong-flying black fly which, because it is a great water drinker, is generally found near inland ponds and streams in all parts of the United States and Canada during the summer. These flies, which attack both men and animals, particularly horses and cattle, are a great pest along country roads and in pine woods, although their bite is not as painful as that of a mosquito, as no poison is injected. The young (pupae) appear first in early spring, and the full-grown fly, which appears from May to July, has a broad head, large eyes and two thin wings. There are 1,500 species, probably 200 of which live in America, and the largest, found in the Southern states, is an inch and a quarter long. The terrible disease known as malignant pustule is carried to men by horse flies from diseased cattle which they bite.

HORSE LATITUDES, the name given by mariners to a belt in the Atlantic Ocean, near the tropic of Cancer, notorious for its tedious calms. It is said that in colonial times vessels freighted with horses from New England to the West Indies were often so long detained under the scorching rays of the sun in this belt of calms that many of the animals perished because of lack of water, and because of this the name was applied. The term, however, is given generally to the same belt in other oceans. See DOLDRUMS.

HORSE POWER is the unit in which the power of an engine is measured. It was determined by James Watt, after many experiments to find the loads that strong draft horses could pull, to be the power required to lift a weight of 33,000 pounds one foot in one minute. If an engine moves the same load one foot in one-half or one-quarter the time, it is twice or four times as powerful, and has therefore two or four horse power. That is, the power is proportional to the time used to pull the load.

If a man weighing 175 pounds climbs seven flights of stairs to a height of seventy-five feet, he will do 13,125 foot-pounds of work. If he does it in one minute, he will exert $\frac{13,125}{33,000}$ or .39 horse power. If the climb requires five minutes, the power will be one-fifth as much, or .078 horse power.

How the Horse Power of an Engine is Determined. Since the development of the gasoline engine considerable confusion has arisen because of various means of determining power, and it is not uncommon to see an automobile advertised as 20 horse power according to one method of rating and 40 horse power according to another. Three methods are explained here.

"Indicated" Horse Power. Steam engines have long been ranked in power according to the work done upon their pistons by the steam. If the force exerted upon the piston of a cylinder is multiplied by the length of its stroke in feet and by the number of strokes per

minute, the result divided by 33,000 will give the horse power of the cylinder. An indicator on the engine tells the pressure of the steam upon a square inch of the piston, and this multiplied by the area of the piston in square inches produces the force exerted. For a gasoline engine exactly the same method may be used, except that there is no indicator and the pressure must be estimated. The latter varies from 45 pounds to 125 pounds to the square inch. For an ordinary engine 60 pounds is considered a conservative figure; for a sleeve-valve engine, 85 pounds. In a four-cycle engine the number of strokes is found by dividing the number of revolutions of the crank shaft per minute by two, since there are two revolutions to every cylinder explosion.

S. A. E. Rating. This is the method approved by the Society of Automobile Engineers, formerly known as A. L. A. M. (Association of Licensed Automobile Manufacturers). It is based on indicated horse power, but assumes that in every engine a piston travels 1,000 feet in a minute and that the pressure on it is about 70 pounds per square inch. It therefore takes into consideration only the area of the piston, and determines the horse power by multiplying the square of the diameter *(bore)* of the cylinder by the number of cylinders, and dividing the result by 2.5. Most automobile engines are now built with a longer stroke than when this method was adopted, and they are very much underrated by it. As a result it is the method generally employed when engines are taxed according to their power, for the amount of the tax is less.

Brake Horse Power. This is sometimes called the *effective* horse power. Instead of being the force exerted at the cylinders it is that which the engine is capable of applying to its work. For steam engines it is from eighty per cent to eighty-five per cent of the indicated horse power. It is determined by tests with a dynamometer. It should not be confused with power exerted by the brakes of an automobile. Obviously this method of rating engines is the most satisfactory, and it is now quite generally employed.

Comparison of the Three Methods. A certain automobile engine of standard type has four cylinders, each with a bore of 3.5 inches and a stroke of 5 inches. Its crank shaft makes 2,500 revolutions per minute. The process of discovering indicated horse power may be expressed in an algebraic formula, as follows:

$$\text{H. p.} = \text{m. e. p.} \times \frac{\pi B^2}{4} \times S \times \frac{\text{r. p. m.}}{2} \times C \times \frac{1}{33{,}000}$$

in which the letters stand for *mean effective pressure* per square inch, diameter of *bore* in inches, length of *stroke* in feet, *revolutions per minute,* and number of *cylinders.* Assuming 60 pounds to be the pressure, the horse power of this engine will be

$$60 \times \frac{3.1416 \times 3.5 \times 3.5}{4} \times \frac{5}{12} \times \frac{2500}{2} \times 4 \times \frac{1}{33{,}000} = 36.4$$

According to S. A. E. rating, the engine will develop

$$\frac{B^2C}{2.5} \text{ (often written } \frac{D^2N}{2.5}) = \frac{3.5 \times 3.5 \times 4}{2.5} = 19.6$$

The brake horse power actually developed by this engine is 39.5, which shows that in this instance more than 60 pounds per square inch is the pressure on the pistons. See STEAM; AUTOMOBILE; PHYSICS. C.H.H.

HORSE-RADISH, a species of water cress, originally a native of Central Europe and Western Asia, but now cultivated everywhere and naturalized in most parts of the world. Its roots, which are long and cylindrical, are extremely pungent in taste, and when grated and mixed with vinegar are served as a relish with cold meats, oysters, etc. They are also used medicinally as a stimulant and to promote digestion, though physicians do not advise their use in this way. As almost any small portion of the root will grow if left in the ground, the plant is very difficult to uproot when once it has become established.

HORSESHOE CRAB

HORSESHOE CRAB, also known as KING CRAB and HORSEFOOT, is a large member of the crustacean family, found along the Atlantic coast of North America, from Maine to the West Indies. It often reaches a length of nearly two feet and is called *horseshoe crab* because of the shape of its shell. It lives in deep waters, feeding on worms and shellfish, coming

to the surface only in spring and early summer to lay its eggs. In burrowing into the sand for food, the head, which forms part of the horseshoe shell, is thrust downward and the spine-like tail is used as a brace to push the body forward. As food the horseshoe crab is valueless, but the strange object is interesting, as it is one of the last remnants of strange animals which inhabited the world in its early history.

HORSETAIL RUSH, or **EQUISETUM,** *ek wi se' tum,* commonly known as SCOURING RUSH, is a weed which quickly takes root in waste and wet places. Only one genus now remains, although in the beginning of the world's history many kinds flourished. Some of these were great trees, as is proved by fossil remains. The present plant is small and tender, with roughly-ridged stem, and is easily identified because of the ease with which it is pulled apart at the joints. In a few species the stem is straight and unbranched, while in others it branches, giving the plant an appearance of a little evergreen tree. The horsetail rush is flowerless, and is allied to ferns and club mosses.

HORSETAIL RUSH
(*a*) Sterile roots; (*b*) fertile roots.

HORTICULTURE, *hawr' ti kul ture,* a word which means, literally, *the cultivation of a garden.* Horticulture, however, has long since outgrown its original significance, for it has developed into an important branch of agriculture, and is itself divided into four main departments—fruit growing, or *pomology,* relating to the cultivation of orchards; the raising of vegetables for the home or market; the raising of flowers and ornamental plants, or *floriculture;* and landscape gardening.

Just as scientific study has helped man to derive greater profits from the practice of general agriculture, so has the development of horticulture taught him how to obtain more satisfactory results in the cultivation of fruits, flowers and vegetables. The successful horticulturist must know what soils and situations are best suited to the various products of orchard and garden, what special methods of cultivation are required for each plant, and what insect pests or plant diseases are liable to injure its growth.

In America, the principles of horticulture are not only taught in the agricultural colleges, but they are explained through the medium of a considerable body of horticultural literature. Between 1804, when the first work on the subject was published, and 1914, over 1,200 books on horticulture went through the American and Canadian presses. About fifty horticultural journals are now in circulation. Another evidence of the liveness of the subject is the attention given to school gardens. This movement is rapidly gaining in favor in the United States, in Canada and in European countries. L.B.

Consult Bailey's *Nursery Book,* also his *Standard Cyclopedia of Horticulture;* Davidson's *Gardens, Past and Present.*

Related Subjects. The articles in these volumes which will be helpful to the reader interested in horticulture are very numerous—there are articles, for instance, on all the important fruits, flowers and vegetables. It is not necessary to index these here, however, as they are all listed under their respective group headings. If the following articles, with the *Related Subjects* indexes under many of them, are consulted, the range of reading will be found to be a wide one.

Agriculture	Gardening
Botany	Herbs
Burbank, Luther	Landscape Gardening
Disease, subtitle	Nut
Diseases of Plants	Plant
Flowers	School Garden
Fruit	Vegetables

HOSEA, *ho ze' a,* a prophet in the kingdom of Israel, who began his ministry in the reign of Jeroboam II and continued through the reigns of four kings in Judah, a period of over thirty years. Although a contemporary of Isaiah, he began to prophesy some years earlier and ceased long before the latter's death.

Book of Hosea, the first in the Old Testament by the minor prophets, not only in arrangement but also in order of time. It consists of two portions, the first three chapters using the details of his own life and his wife's unfaithfulness to him as an illustration of the second part, where he laments the unfaithfulness of Israel to Jehovah in introducing idolatry and other shameful rites into their religion.

HOSMER, *hahz' mer,* HARRIET (1830-1908), an American sculptor whose art in its tendency leaned toward the classical. She was born at Watertown, Mass., and studied under John Gibson at Rome. In addition to a fountain in Central Park, New York, and two foun-

tains in private possession in England, she executed ideal heads of *Daphne* and *Puck*. *The Sleeping Faun, Waking Faun, Zenobia in Chains* and *Beatrice Cenci* are considered among the best of her works.

HOS'PITAL, a word derived from the Latin *hospes,* meaning *guest,* was originally applied to a place of shelter for the sick and wounded, the aged, the destitute, the infirm, and young and helpless children. In the modern sense a hospital is a building or group of buildings in which those who are sick or injured receive nursing and medical or surgical treatment; *asylum, almshouse, orphanage, home,* etc., are applied to various institutions formerly included under the general term *hospital.* Institutions for the care of those diseased in mind are generally known as hospitals for the insane (see INSANITY).

There are two main classes of hospitals, general and special, the former admitting cases of all kinds, the latter accepting patients suffering from a special disease or group of diseases. Some hospitals are for the reception of victims of contagious disease, and there are special hospitals for children, for men and for women.

Plan of Construction. Nearly all hospitals are modifications of two types of construction—the pavilion scheme and the multiple-story plan. The Virchow Hospital of Berlin, with fifty-three separate one-story buildings, covering an area of ninety-six acres, is an extreme example of the first type; the hospital of many stories on a small ground area, often seen in large cities of the United States and Canada where sites are very expensive and frequently difficult to obtain, is typical of the second class.

The average modern hospital is built on the following plan: There is first an administration building, containing offices, parlors for visitors, a chapel, an examination room, a pharmacy, and other departments which serve the institution as a whole. The patients are cared for in wings or pavilions, one, two or three stories high; these contain the public wards with many beds, and the private wards and rooms, which are for the accommodation of but one patient in each section. Diet kitchens, dining rooms, baths, lavatories, nurses' rooms and other service apartments adjoin the wards. The surgical section, comprising the operating, anesthetic, sterilizing and recovery rooms, is often found on the top floor. There are, in addition, nurses' living quarters, recreation rooms, a laundry, power house, sun parlors, etc. These are sometimes housed in wings of the central building, and sometimes in separate structures. In the best modern hospitals the equipment, furnishings and provisions for heating and ventilation represent the highest degree of scientific achievement.

Organization. The governing body of a hospital is known as the board of managers; its members are usually appointed by the governor if the institution is under state control, while the board of a private hospital is generally elected by the hospital-association membership. The chief executive officer is the superintendent. Other house officers are a superintendent of the nursing department, a matron, or housekeeper, a steward, who has charge of all food supplies, an engineer and a pharmacist. Men servants, called orderlies, are attached to the nursing department. Nurses are subject to the orders of *internes,* or graduates of medical schools who reside in the hospital and are in constant attendance for the experience they may gain, receiving no remuneration except their board and lodging. The period of interneship varies from one to three years. The internes are under the direction of attending physicians engaged in general practice in the city, who visit the hospital at specified periods, and have oversight of the treatment given the patients. In the best-organized hospitals each department is under the supervision of a competent visiting staff, and each is provided with a resident physician, internes and assistants.

Training of the Nurse. One of the most important functions of the modern hospital is the training of women for professional nursing. The courses leading to the diploma granted a graduate nurse vary in length from two to three years. Some hospitals require an admission fee, and, instead of giving the pupil nurses an allowance, furnish them with uniforms and books, while others forego the entrance fee and pay their students an allowance of from six to ten dollars a month for necessary expenses.

The prospective nurse first enters upon a period of probationship, varying from three to six months. In the smaller hospitals she goes first to the wards, where she begins her work by running errands, amusing child patients and assisting the older nurses as they make demands upon her. Then gradually she learns the general duties of caring for the sick. In the larger institutions the probationer is taught

first to cook delicacies for the invalid and the more substantial food relished by the convalescent. She also receives instruction in the pharmacy concerning the ingredients of the most important drugs, and is taught how to compound them and how to read and fill prescriptions. The making of surgical supplies and the care of the dispensary rooms are also included among her duties.

After she becomes a pupil nurse, her work is mainly in the wards, though she is required also to assist in the operating room. In addition to the practical experience acquired in caring for the sick, she takes courses during her period of studentship in anatomy and physiology, hygiene, bacteriology and pathology, dietetics (the science of diet), massage and bandaging; this training also includes various general and special courses in surgery and medicine. The daily routine of the pupil nurse in a modern hospital is somewhat as follows:

7-10 A. M.	Wards—routine work.
10-10:40	Domestic work (cleaning utensils, bath tubs, dusting, etc.).
10:40-11	Lunch and change apron.
11-12	Class or class-room.
12- 1 P. M.	Recreation and luncheon.
1- 2	Study in private room.
2- 4	Recreation out-of-doors.
4- 6	Wards—routine work.
6- 7	Preparation of surgical supplies.

The last hour of the week is frequently utilized as a lecture period. At seven o'clock the nurse dines, and her twelve-hour working day is over. Some hospitals have a ten-hour and others an eight-hour day, but usually the nurse observing the twelve-hour schedule is allowed more time off than the one who works fewer hours. One afternoon off each week and one or two Sunday afternoons during the month are generally permitted the former. The average yearly expense of a hospital course amounts to about $100.

Graduate nurses who continue in hospital work receive as a beginning salary $30 a month. In the course of time this increases to $75 a month. Hospital nurses have work the year round, an annual paid vacation, and their board, lodging and laundry are provided for. In addition they receive free nursing and medical attention while ill. Superintendents of nurses in large training schools receive from $1,000 to $1,500 a year. Private nursing seems at first thought to pay better than hospital work, as the efficient private trained nurse can always command $25 a week, besides her board, lodging and washing. It must be remembered, however, that there are always periods of inactivity, during which expenses continue while income ceases. These seasons of idleness reduce materially the yearly income of the private nurse.

Necessary Qualifications. The question "Shall I become a trained nurse?" comes to many a young woman who must decide upon a vocation. No one should answer this question in the affirmative who is not strong in mind and body and able to bear constant and severe strain upon the nerves. Nursing is an exacting profession—one that demands patience and perseverance, gentleness and sympathy, tact and self-control, and constant sacrifice for the good of the weak. To the nurse fall many disagreeable and laborious tasks. She must be willing to bear with the petulance of the sick, and to obey her superiors; she must be ready at all times to act quickly and with composure. Above all she must love her work, believing that there is no higher calling than that of serving others.

Military and Naval Hospitals are maintained by civilized nations for the care of sick and wounded soldiers and seamen. In Europe fighting men in need of medical attention and nursing are often cared for in civil hospitals, but the United States government keeps its military establishments entirely separate. Hospitals under the supervision of the Department of War are maintained at Washington, D. C., San Francisco, Fort Bayard, N. M., and Hot Springs, Ark. That at Fort Bayard receives consumptives belonging to the United States army and navy, and the one at Hot Springs is maintained for soldiers who may be helped by the mineral springs.

In time of war temporary hospitals, which can be moved from place to place, are operated on the field of battle. During the War of the Nations the French army kept in service an automobile hospital having a forty horsepower motor, capable of developing an average speed of twenty miles an hour. This hospital was equipped with an operating room containing the latest appliances, including sterilizing and electrical apparatus and X-ray equipment. The most serious wounds cannot always be cared for in the ordinary field hospital, and in many cases the wounded have died before they could be removed to a permanent hospital. The motor-hospital of the French army was therefore a means of saving many lives and of preventing many cases of permanent deformity.

ical. The germ of the modern hos-
ıy be found in a well-known custom of
ients. Centuries before the birth of
he Egyptians and Greeks brought their
› the temples of the gods for medical
ıt. Yet the hospital as it exists to-day
tially a product of Christianity. Rec-
ow that the first organized establish-
r the care of the sick was founded by
asil at Caesarea, in Cappadocia, A.D.
ıe hospital, therefore, antedates the uni-
(which see) by many centuries. Hos-
ıultiplied in Europe during the Middle
ırgely because of the development of
cism, the care of the sick being one
most important functions of the reli-
ders of medieval Europe. The preva-
contagious diseases, brought into Eu-
ım the East by the returning Crusaders
USADES), also stimulated the erection of
s.

ıldest hospital in the world still exist-
the famous Hôtel Dieu, in Paris, an
on dating from the seventh century.
t erected on American soil was estab-
n the City of Mexico, by Cortez, in
Jnder the name "Hospital Jesus Naz-
t is still maintained. The history of the
ın hospital begins with the year 1639,
ıe Hôtel Dieu was founded at Sillery.
ıs later transferred to Quebec. In the
ty is the great General Hospital, estab-
n 1693. The Hôtel Dieu of Montreal
es from the seventeenth century.

53 a hospital was erected on Manhattan
or the treatment of sick soldiers and
in the employ of the East India Com-
This was the first institution of its kind
is now United States territory. Benja-
anklin was one of the petitioners for
orporation of the Pennsylvania Hos-
ıe corner stone of which was laid in
ince that early period hospitals have
ed both in the United States and Can-
ı the former country there are over
ontaining over 153,000 beds. Among
ıadian provinces Ontario leads, with
ty hospitals; the province of Quebec
ut half that number. J.H.K.

lt Hornsby and Schmidt's *Modern Hospi-*
evens' *Modern Hospitals;* Hodson's *How*
ne a Trained Nurse.

AGE, *hahs'tayj,* a person taken as a
of security or for the performance of
ns of a treaty or contract. The cus-
taking or giving hostage, which was formerly almost universal, has been practically obsolete among modern communities, but with the outbreak of the War of the Nations it experienced a revival. Many cases (notably in Belgium) were recorded in which the German forces exacted obedience from conquered cities, threatening to take the lives of certain of their inhabitants, whom they held, if conditions of peace were not maintained. The ethics governing the rights and treatment of hostages form an important branch of international law.

HOT'BED, a device for germinating seeds and forcing the growth of young plants by raising the temperature above that of the air in the open. A hotbed is made by removing the soil to the depth of six or eight inches from the patch of ground selected, then placing a layer of horse manure and litter in the excavation and covering it with the soil, taking care to make the layer of uniform thickness. The bed is then enclosed in a frame made of boards eight or ten inches wide. It is then covered with windows. These may be made especially for the purpose, or storm sash may be used. The bed should slope gently toward the south, to get all possible sunshine, and be so placed that buildings or trees will not cast a shadow upon it. The sash should be opened daily for ventilation. Plants started in a hotbed are usually transplanted as soon as the season is far enough advanced. Near large cities extensive hotbeds are used by truck gardeners.

A cold frame is similar to a hotbed, except that no manure or other fermenting substance is used to increase the temperature. The sun warms the air under the glass.

HOTCH'KISS GUN. See MACHINE GUN, subhead *The Hotchkiss.*

HOTEL, *ho tel'.* "He who has not been at a tavern knows not what a paradise it is," quotes Longfellow from Pietro Aretino. If the poet from Arezzo could visit a "tavern" built four centuries after his own times he would repeat his exclamation with a new meaning in the words. In his day each tavern and inn had only a few rooms for the accommodation of travelers, and if more than a half dozen guests arrived on the same evening some of them probably had to sleep in a stable loft. It was only as a gathering place for a jolly company of care-free townsmen that the medieval hostelry could be likened to a paradise, but in many a hotel of to-day may be found material comfort, luxury and splendor

far in excess of what Popes and kings of the Middle Ages, with all their wealth, could have commanded. In some of the great hotels of large cities there are more rooms than in all the inns Aretino could have visited in a year's journey.

Hotels of the present day may be roughly placed in three classes—the *commercial* hotel, the *tourist,* or resort, hotel, and the so-called *family,* or residential, hotel.

The commercial hotels, whose guests usually are people traveling on business, have reached their highest development in America. In New York, Chicago and San Francisco there are several with over a thousand guest rooms each, and in a number of other cities there are many nearly as large. Canada's largest hotel, in Montreal, has 700 rooms. Most of these buildings are of the skyscraper type. They require hundreds of servants, and the most enterprising of them contain such conveniences as swimming pools, Turkish baths, and nurseries where children may be left while mothers shop. In the United States guests are commonly charged on what is called the *European plan;* that is, they are charged a fixed rate per day for their room and are free to eat where they please. The so-called *American plan,* according to which the charge includes three meals a day, is more common in Canada than it is south of the international border.

In recent years it has become customary for hotels in different cities to be associated under the same ownership or management, so that each advertises the other. Perhaps the most famous hotel chain is that which includes the Ritz Hotel in London and the Ritz-Carlton hotels in New York and Philadelphia.

In America summer and winter hotels and hotels for tourists are often larger than commercial hotels, though not usually so well constructed. In Europe, however, tourist hotels are often the best. The smaller ones, conducted more or less in boarding-house fashion, are called *pensions.* Among the famous chain-hotels for tourists are those of the Canadian Pacific Railway and of the Flagler system, the latter on the east coast of Florida.

The Hotel Keeper and His Guests. In law, hotel proprietors are known as *innkeepers.* Like a railroad, which is a *common carrier,* and a street railway, which is a *public utility,* a hotel keeper has certain legal obligations to the public. He is obliged to admit all respectable persons as guests and furnish them lodging at reasonable rates, unless, of course, his house is filled. By the common law he is also responsible for the safekeeping of the property of guests, but in most states and provinces statutes provide that if he furnishes a safe and so notifies his guests, he is relieved of responsibility except for goods deposited in it. In return for his liabilities the innkeeper has privileges, chief of which is a lien on guests' property until they pay. C.H.H.

HOT SPRINGS, ARK., one of the most famous health and pleasure resorts in the United States. It is the county seat of Garland County, situated southwest of the geographical center of the state, about sixty miles by rail southwest of Little Rock, the capital. The Chicago, Rock Island & Pacific, and the Saint Louis, Iron Mountain & Southern railways serve the city. Throughout the year, especially in winter, thousands of people are attracted to the resort. The permanent population in 1910 was estimated at 17,238; in 1910 it was 14,434. The area is about five square miles.

The city has a picturesque location 600 feet above sea level, in a sheltered valley of the Ozark range. On the side of Hot Springs Mountain, within an area of ten acres, are found forty-four hot springs, which yield daily about 830,000 gallons of clear, tasteless, odorless water possessing curative properties. These springs are owned, operated and controlled by the United States government and are said to possess radioactivity to a marked degree. The water is prescribed for bathing and drinking in treating gout, rheumatism and various other physical disorders. The drinking of large quantities of the hot water, as well as bathing, is prescribed, and drinking fountains on the thoroughfare are provided, where, at any time during the day, groups of health seekers with their collapsible drinking cups may be seen. Noted athletes come here annually to train. On Hot Springs Mountain the United States government has established an army and navy hospital; more than $1,000,000 has been expended in its erection, in beautifying the grounds and in arching Hot Springs Creek, which flows through the city. Some of the most palatial bathhouses in the United States are found in the city; the government provides for those who cannot afford bathing fees.

It is said that the Indians were the first to discover the curative properties of the springs. Dunbar and Hunter, of the Lewis and Clark Expedition, visited the site in 1804, and a settlement was made in 1807. From 1832 until 1876, when title was held by the Supreme Court

to be in the United States, Hot Springs Reservation was famous in the history of land titles. In the latter year it became a town, and a city charter was granted in 1878. Since 1907 two fires have caused great loss of property, large sections of the city having been entirely destroyed. J.S.C.

HOTTENTOTS, *hot''n tots,* an African race, the original inhabitants of the Cape of Good Hope Province, now a part of the Union of South Africa. They are in many ways a peculiar race, and appear to be held in contempt by both Europeans and the darker natives of Africa. The Hottentot is of small stature, and has a dirty, livid, yellow complexion, thick lips, flat nose with wide nostrils, and large ears. The hair is coarse and woolly, and the men have very scanty beards. Young Hottentot girls are considered attractive. They marry very early, sometimes at the age of eleven or twelve. After marriage they age very quickly, and when only in the twenties they may appear old and shriveled.

Although some Hottentots are industrious and reliable, most of them are degraded and vicious, given to lying, drunkenness and sensuality. There are probably not more than 20,000 true Hottentots left in the whole province, although they formerly numbered 200,000 and were once rich in cattle. The early Boer settlers in Africa waged constant war on them, and the survivors of the seven tribes composing the race were scattered to all parts of South Africa.

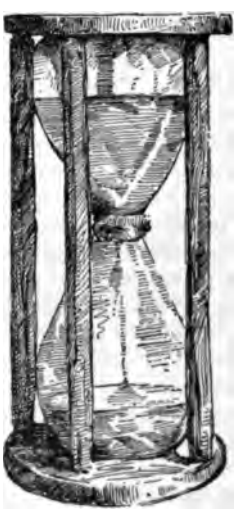
The origin of the Hottentots has been a puzzle to anthropologists, but it is now generally believed that they are a cross between the Bantu negro and the Bushman, the latter element being seen in their yellow color, prominent cheek bones and pointed chin. In physical characteristics they show many variations from other negroid types. See BANTU; BUSHMEN.

HOUDON, *oo dawN',* JEAN ANTOINE (1741-1828), the greatest French sculptor of the eighteenth century. He executed over 200 busts of eminent men and women, including Washington, Franklin, Napoleon, Lafayette, Mirabeau and Rousseau.

Houdon was born at Versailles, where, in 1890, a statue of him was erected. At the age of thirteen his work began to attract attention. In 1761 he won the *prix de Rome* (the prize of Rome), and continued his studies in that city for over ten years. Upon his return to Paris he became professor at the Ecole des Beaux Arts. In 1785 he visited America with Franklin, and during his stay executed a statue of Washington, which now stands in the rotunda of the state capitol at Richmond, Va. Among his other important statues are those of Voltaire and Cicero. Other works of note are the familiar *Ecorché* and his *Diana the Huntress,* made for Catharine of Russia. His works show wonderful technical skill and adroitness which bespeak complete mastery over his material.

HOUND, a name given to all breeds of dogs, with one exception, which hunt their quarry by scent. The greyhound, in spite of its name, does not come under this heading, as it hunts entirely by sight. All hounds, though they vary greatly in appearance, are originally derived from the old southern hound, or talbot. The bloodhound is nearest in type to the original breed, which has changed in some cases so greatly that no resemblance to the talbot remains. Some hounds have rough coats, while others are smooth haired; it is a curious fact that rough-haired hounds show great affection for men, while the other varieties appear indifferent to them. The most commonly known hounds are the bloodhound, staghound, foxhound, beagle, and dachshund. Descriptions of these will be found under their respective titles in these volumes.

HOURGLASS, a device formerly used for measuring time. It consisted of two glass bulbs, placed one above the other and united by a narrow neck, through which a quantity of sand, or sometimes mercury, ran in exactly an hour. When all the sand passed into the lower part, the instrument was reversed. Similar devices intended to measure shorter intervals were also appropriately named, as, for example, a half-hour glass. A smaller instrument of like construction, used to indicate the required time for boiling eggs, is called an egg glass. Devices patterned on the same principle are still used in some coun-



HOURGLASS
Drawn from a typical hourglass of a day when such devices were in use.

tries by sailors for the purpose of measuring the time during which the logline is allowed to run out. However, the device is now practically a curiosity, which emphasizes the later inventive genius of mankind.

Writers use the term hourglass figuratively to denote the passage of time. Shakespeare says, in *The Merchant of Venice:*

I should not see the sandy hourglass run
But I should think of shallows and of flats.

Longfellow has a poem on *Sands of the Desert in an Hourglass,* and Douglas Jerrold, in *Time,* varies the usual reference:

To the true teacher time's hourglass should still run gold dust.

HOUSATONIC, *hoo sa ton'ik,* a river of the United States that is of great importance in supplying water power to numerous textile and other manufactories. It rises in the Berkshire Hills in Massachusetts, about two miles south of Hinsdale, and flows southward through Connecticut, entering Long Island Sound about four miles east of Bridgeport. The tide ascends to Derby, fourteen miles from the Sound. Throughout its course of 150 miles the river flows through a country noted for its scenic beauty. Among the important industrial centers on the Housatonic are Shelton, noted for its brass works, and New Milford, with its large hat factories. In the valley of the river are several small limestone quarries.

HOUSEHOLD ARTS IN EDUCATION. To teach how a home may best be conducted is the purpose of the household arts in the schools. It means the application of science to the preparation of food, the cleaning of the house and the clothing of the family. It means that the nation recognizes the importance of good homes and has directed its schools to provide more skilful workers and more efficient managers for them. It means that the housewife is to be trained for her work as the doctor or lawyer is trained for his profession.

As studied in schools and colleges, the household arts have usually included four general subjects—shelter, food, clothing and household management. The first three of these are evidently the chief material factors with which a family deals in a home—the house itself and its furnishings, the daily service of food and the providing of personal clothing; and each of these is a matter of concern to the family from three points of view, as regards, first, its *selection,* or the original choice of house, food or clothing; second, as regards its *preparation,* or the household processes of making things : use, and storing, repairing, renewing ; and third, as regards its *actual use* ing the recurring needs of the family. *Management,* or the fourth topic in household arts, considers the general problems of organizing and directing the immediate business of the household, the performance of its work, the expenditure of its money, the care of the members of the family, and the supervision of the home life. Foods and clothing have been chiefly emphasized in household arts teaching, but recently shelter, and especially management, have received increased attention.

Why It Is Important. As the household largely controls the health, individual efficiency and character of its members, housekeeping is evidently a matter of vital national concern. From the family each of us receives at birth the gift of life, and through the family group largely each receives his religious beliefs, his ideas of right and wrong, his fundamental virtues, and especially that ability to coöperate with others which makes possible social life and organized business and government. In connection with the study of household arts this broader significance of the family may be at least suggested, and the ideals that underlie the modern home, such as the essential partnership of husband and wife, the equality of woman with man, the rights and duties of children, may be impressed upon young people

o guide them in their later home life. old arts is also especially important as ional study for the girl, since skill in d is not only a means of earning money aving school but later has a direct prac- alue in her own home in case of mar- other vocational training of the girl, as istry, ordinarily becomes useless when rries and becomes a home-maker.

Household Arts Came into the School. usehold arts are part of a new school n, that of vocational education, which rain every worker for his work, whether hat of the farm, the shop, the store or ne. This is to be effected, not by cur- the individual's general or academic on, but by adding to his general pur- Thus household arts as vocational train- supplement to, not a substitute for, the education of the girl. Beginning with lustrial Education Commission of Mas- tts in 1906, which resulted in a law state aid to vocational instruction in ure, the industries and household arts, legislation has since been adopted in twenty states, and every state has felt pulse of the movement for establishing nal schools. The United States Con- as recently voted large appropriations ching agriculture and household arts in listricts. In the last few years there us come about a rapid extension of old arts teaching on the vocational

nfluences other than the vocational edu- movement have helped to bring house- ts into the schools. *Manual training,* or hand activities, introduced as a supple- o book study, and intended to improve education rather than give vocational y, came into many schools, beginning 880, with a program that included cook- l sewing for girls. A fundamental in- favoring household arts teaching has e modern application of natural science, ry, physics and biology to practical af- As early as 1857 Youman's *Handbook sehold Science* outlined the relations of sciences to the household, and to-day s a great and growing body of scientific dge available for teaching in household urses.

modern social-welfare movement, which assure to every person the essentials cent living by reducing the causes of and promoting the conditions of well-being, has helped secure a place for household arts. The first widespread organization of such instruction was the philanthropic "kitchen-garden" classes, beginning about 1876; to-day the social-work aspect of household arts is increasing through settlement classes, housekeeping centers, visiting housekeepers to teach better ways of living, factory and store welfare work, school centers and rural community work. Household arts education has also received an impetus from the woman's movement, so-called, for as woman's interests have received a hearing in law, business, politics and other fields, the household, which is woman's great vocational field, has had recognition in the schools. Primarily, then, the household arts in education are a result of the new vocational education movement, but manual training, the application of science to practical affairs, the recognition of woman's interests and the modern emphasis on social welfare have each helped to open the way.

The Educational Program. Preparation for home life has long been one of the aims of education, as in the kindergarten, which has chosen its gifts and games to illustrate home, church, and state, and in the modern elementary school, which introduces informational lessons from the child's world of home, street and playground. Household arts study, however, has brought into the school the practical processes involved in housekeeping and the systematic knowledge underlying them. As organized in typical schools, one finds in the first six grades simple lessons in cooking and sewing, which are often given to boys and girls alike. Sometimes this is part of a comprehensive program of activities chosen from farm, shop, store and home, to give industrial and social knowledge for later intelligent choice of a vocation. In the last grades of the elementary school and in the high school, the girls usually study cooking, sewing and housework, intensively, with the aim of acquiring vocational knowledge and skill. In all household arts teaching, two elements enter—*theory,* or the explanation of processes, and *practice,* or exercises for the sake of skill; emphasis may be on theory or on practice, according to the purpose of a particular course. However, in vocational instruction the final aim is skill in the profession of home-making, or in some special vocation related to household arts, such as cooking, dressmaking, millinery or management. Some courses go to the other extreme and emphasize scientific explanations.

For the high school girl who goes to college, the state universities and technical colleges usually credit for college admission high school work in household arts, but some academic colleges do not. In these higher institutions, the household arts student may take a general home-making course which gives due attention to shelter, foods, clothing and management, or she may specialize in any one of the vocations based on household arts—dressmaking, costume designing, house decoration, dietetics, food inspection, consulting or managing housekeeping, tea room or restaurant or dining room management, household arts journalism, lecturing on household subjects, and, especially, the teaching of household arts. The latter offers a wide range of opportunity, with specialization possible in various subjects, such as foods and cookery, textiles, clothing and management, and also in various types of work such as that of the elementary teacher or supervisor of household arts, high school or college teacher, rural extension worker, supervisor of girls' canning clubs and teacher of continuation classes. This last type of work, continuation classes, bids soon, under the encouragement of laws on the subject, to make available in every community, urban and rural, an opportunity for young women who are at work or home, for mothers and for employed houseworkers to study the practical elements of cooking, sewing, care of children, home nursing and other aspects of housekeeping, in daytime or in evening classes for a few hours a week.

The girl who is considering whether she will study household arts beyond the high school should make inquiries as to courses given by the normal schools and the colleges or university of her state or province; she might well also examine the courses of such institutions as the University of Chicago; Teachers College, New York City, and Simmons College, Boston. In the universities she will find opportunity for training in research and investigation in the household arts field, which itself is coming to furnish a profession for a limited number of persons, as in the investigations of the Department of Agriculture in Washington and of certain of the universities.

Practice. In studying household arts one should use every opportunity for practical experience. Wise parents will let the daughter cook for a time, or do the marketing, or keep household accounts. All children should begin early to share in certain household duties; a small allowance to be used for some purpose, as the purchase of clothing, will teach mo values and responsibility. It is a wise rule consider one's own home and see whether w is studied in household arts may not be appl there—such as conveniences in the kitchen definitely planned *menus*. It is with the m purpose of adding experience to theoret knowledge that in many high schools the g in household arts do practical work in school lunch room, or undertake the servin tea or simple catering in private homes, help as "accommodators" in getting dinne washing dishes, on order for a family. In best colleges there is a similar emphasis practical field work in lunch rooms, cate service, practice houses or apartments, and private homes. Experience is as necessary the household arts expert as is hospital w for the doctor. B.R.

Related Subjects. The reader will apprec the wide range of allied topics presented in t volumes, as follows:

Costume	Industrial Art
Domestic Art	Interior Decoration
Home Economics	Sewing

References. In a rapidly-developing field as household arts, reference for information often best be had to higher institutions teac the subject, rather than to books. The home nomics department of a good college or univer in one's own state or province can usually furn detailed information; the state or provincial partment of education will furnish facts on school situation in any particular locality. following references may be consulted: Bu tins on *Education for the Home*, Parts I- United States Bureau of Education, Washingt *Journal of Home Economics*, Station N, Ba more, Md. (monthly, devoted to household a education); *Syllabus of Home Economics*, p lished by *Journal of Home Economics*, Baltim Md.; chapters on *Home Economics*, in Ann Reports of United States Commissioner of Ed cation, Washington.

HOUSE'LEEK, or LIVE'-FOREVER, group of plants common in almost every p of Europe, usually found on walls and roofs cottages. The name *live-forever* refers to t vitality of the hardy little plant, which gro wild in the Alps upon rocky soil. Upri stems about six inches in height bear broad of purplish star-shaped flowers. Its petals eq in number the sepals, or divisions of the ca and are inserted at the base of the calyx. T leaves are usually arranged to form compa rosettes. The leaves, when bruised or cut a applied to burns and to the stings of bees wasps, afford relief. They are beneficial al when applied to inflamed sores, though not widely used for that purpose to-day.

ae of the species found in Southern Eu- are shrubby, while others are common house plants. In the botanical garden of ard University is an interesting collection ese plants.

USE OF COMMONS AND HOUSE OF S. See PARLIAMENT.

USE OF REPRESENTATIVES. See SENTATIVES, HOUSE OF; CONGRESS OF THE D STATES.

USTON, *hu'stun,* SAM (1793-1863), an ican soldier and political leader, a promi- figure in the struggle through which Texas d its independence from Mexican rule. n he was thirteen years of age his family ved from his e town of gton, Ken- , to the ern frontier Tennessee. g of school of a position rk in a trad- store, Sam away when as about fif- n, and for y three years with the okee Indians ast Tennes-

SAM HOUSTON
President of the republic of Texas and later Senator from Texas in the United States Congress.

On his return to civilization he opened intry school, then enlisted in the United s army, serving under Andrew Jackson in ar against the Creeks. Later he studied at Nashville, beginning practice in Leba- Tenn., and in 1822 was sent to Congress. years later the Jackson Democrats elected governor of Tennessee.

1832, while on a visit to Texas, Houston ted the invitation of the American colo- of that province to become their leader e struggle for independence. At the head small company of raw volunteers he con- d the military movements which led to efeat of Santa Anna in the famous Battle n Jacinto, April 21-22, 1836, and the fol- g September was elected President of the republic of Texas. This position he held from 1841 to 1844. He was the leading in bringing about the admission of Texas the Union in 1845, represented that state e United States Senate from 1846 to 1859, was its governor from 1859 until the out- of the War of Secession. He then retired to private life. The city of Houston, Tex., was named in his honor. See TEXAS, subhead *History.*

Consult Williams' *Sam Houston and the War of Independence in Texas;* McElroy's *The Winning of the Far West.*

HOUSTON, TEX., the county seat of Harris County and the third city in size in the state, ranking next to San Antonio and Dallas. Houston is one of the most important railway and business centers of Texas. It is fifty miles northwest of Galveston, on the Buffalo Bayou, an inlet from the Gulf of Mexico which has been transformed into a ship canal by the Federal government at a cost of $2,500,000, giving the city direct water communication with the Gulf, Atlantic, South American and European ports. This channel, including the great turning basin in Houston, is fifty-four miles long. A number of bridges cross the bayou, which extends through the city.

Houston is served by the International & Great Northern; the Gulf, Colorado & Santa Fe; the Southern Pacific; the Missouri, Kansas & Texas; the Gulf Coast Lines; the Houston Belt & Terminal, and a number of other railroads, to the total of seventeen. An electric line operates to Galveston. The area of the city, extended in 1914 by annexation, is over thirty square miles. The population, which in 1910 was 78,800, was 112,307 in 1915, by Federal estimate.

Location and Parks. Houston is attractively located in a country rich in timber, especially yellow pine and red cedar, oak and elm. Excellent shell-paved motor roads extend to near-by towns and resorts and to the beaches, which afford surf bathing and deep-sea fishing. Splendid magnolia trees beautify the streets of the city. Sam Houston, Cleveland, Elizabeth Baldwin, Highland and Sattegast parks, and a number of smaller playgrounds, contain more than 850 acres, and five of the larger parks are joined by a boulevard which circles the city.

Buildings and Institutions. The Federal building, completed in 1913 at a cost of $500,000; the county courthouse; the Auditorium, which seats 7,000 people; the city hall and adjoining cotton exchange and city market; the union station, Y. M. C. A. building, Carnegie Lyceum and Library and a number of fine bank buildings, hotels, schools, clubs and churches are prominent structures. Houston contains the William M. Rice Polytechnical Institute (coeducational), Saint Agnes' Acad-

emy, Texas Dental College and a number of private schools and business colleges.

Industries. In the rich agricultural country surrounding Houston, winter vegetables, rice, cotton, sugar cane, corn, alfalfa and citrous fruits are the principal crops. Large cape jessamine nurseries cultivate both the blossoms and plants for an extensive market. Iron and lignite are found in the neighborhood, and oil fields close at hand increase the commercial importance of the city. Cotton compresses, oil mills, planing mills, foundries and machine shops, rolling mills, pencil factories, potteries, brick and tile works, petroleum and sugar refineries, rice mills and elevator, a coffee-roasting establishment, carriage and wagon shops and large railroad shops represent the chief industrial enterprises. Cotton, corn, sugar, rice and quantities of other produce are shipped by rail and boat.

History. The city was settled in 1836 and named in honor of General Sam Houston (which see). It was the capital of the Republic of Texas during the years 1837-1839 and 1842-1845. In 1907 the city adopted the commission form of government. M.W.

HOWE, *how,* ELIAS (1819-1867), the inventor of the first practical sewing machine, a device that revolutionized the dressmaking industry and has immeasurably lightened the burdens of women throughout the world. Howe was born in Spencer, Mass., where in his youth he worked as a mechanic in his father's mills. While employed in a machine shop in Cambridge, Mass., he conceived the idea of a machine that would take the place of hand labor in sewing, and his first experiments with what was to be an epoch-making invention were made in a humble little garret he called his home. An old school friend having made him a loan of $500, Howe succeeded in completing a model of his machine in 1845. The following year he secured a patent, but it was only after a long period of poverty and discouragement that he gained any substantial reward for his ingenuity and perseverance and his desire to help the world.

ELIAS HOWE

There was so much opposition to the new machine in America that in 1847 the young inventor went to England, hoping to obtain financial assistance from capitalists in that country. In this he was disappointed, and after selling the English rights to his invention for $1,000, he returned to America. During his absence several manufacturers had infringed upon his patent rights, and he found a number of sewing machines on the market. To protect his invention and establish his patent Howe was forced to spend long years in wearisome lawsuits, but he finally won, and eventually he earned a great fortune by manufacturing sewing machines and through royalties from other manufacturers. Howe was one of the Connecticut volunteers in the War of Secession. In 1867, the year of his death, he received the gold medal and the cross of the Legion of Honor at the Paris Exposition. See SEWING MACHINE.

HOWE, JOSEPH (1804-1873), a Canadian journalist, orator and statesman, who was responsible, more than any other man, for the establishment of responsible government in Nova Scotia. He was the political idol of that province for a generation, and is considered the greatest English-speaking orator Canada has produced. Joseph Howe's father was John Howe (1752-1835), who was a printer and newspaper editor in Boston, Mass. When the Revolutionary War began he remained loyal to the king, and like hundreds who shared his views, emigrated to Nova Scotia, where he was for many years postmaster-general of the Maritime Provinces. There, at Halifax, Joseph Howe was born on December 13, 1804. He had little formal schooling, but was taught in many subjects by his father. At the age of thirteen his brother, then the owner of the Halifax *Gazette,* took him as an apprentice, and later employed him as a journeyman compositor. The boy acquired a reputation for quick wit and intelligence and also for numerous little poems which he contributed to the *Gazette.*

JOSEPH HOWE

Journalism and Fame. In 1827, being then twenty-three, he embarked in the newspaper

business on his own account, and became editor and joint owner of a weekly called *The Acadian*. After a year he sold his interest to his partner, and purchased *The Nova Scotian*, which he edited until his election to the Nova Scotia assembly in 1836. In 1830 he began to write a series of *Legislative Reviews*, in which he criticized, first with caution and later with increasing boldness, the public men of Nova Scotia. All government officials were then appointed by the lieutenant-governor and were independent of the people, and, notably in Halifax, were guilty of glaring dishonesty. Howe's attacks on them culminated in an article in his paper on January 1, 1835, when the charge of corruption was openly made. So specific was the charge that prosecution for libel was the answer. The jury took just ten minutes to decide that he was not guilty.

His Political Career. The result of this remarkable episode was that Howe became the hero of the people. In dramatic fashion he had given the deathblow to the old system of municipal government, and in 1841 a new system of elected city officials was provided by statute. In November, 1836, Howe was elected to the assembly, which, under his leadership, brought about many important reforms (see NOVA SCOTIA, subtitle *History*), and after a bitter struggle with the governor responsible government was won in 1848. Howe was appointed to the executive council as provincial secretary, and two years later went to England to secure funds for the Intercolonial Railway, a scheme which was very close to his heart. He finally (1854) resigned from the cabinet, and took the position of chief commissioner of railways. He remained in the assembly, however, until 1863, except for an interval of a year. From 1860 to 1863 he was premier of Nova Scotia.

In the latter year the British government appointed him fisheries' commissioner to the United States. In this position his duties prevented him from taking an active part in the movement for Confederation, although he had for years written and spoken of the desirability of such a plan. It has been said, no doubt with some degree of truth, that if Howe had been present at the Charlottetown and Quebec conferences, and had helped to draft the resolutions, he would have been heart and soul in favor of Confederation. However that may be, Howe became the leading opponent of the plan, and after it was adopted tried to have the British North America Act repealed. Failing in this, he sought and obtained better financial terms for Nova Scotia. He was elected to the House of Commons in 1867, and in 1869, though a lifelong Liberal, accepted the presidency of the council in the Macdonald Ministry. In 1870 he became Secretary of State, and in May, 1873, was appointed lieutenant-governor of Nova Scotia. His death came unexpectedly on June 1, 1873. G.H.L.

HOWE, JULIA WARD (1819-1910), a distinguished woman whose activities covered the fields of authorship, philanthropy and politics. Her best-known poem, which thrilled the North and was sung with patriotic fervor for many years, was *The Battle Hymn of the Republic;* it was written while she was visiting military camps near Washington in 1861, soon after the outbreak of the War of Secession, and has been called the "Marseillaise of the unemotional Yankee." After the slavery question had been settled, Mrs. Howe became active in the cause of woman's suffrage, prison reform and universal peace. She was likewise deeply interested in clubs, notably the New England Women's Club, of which she was made president in 1872. Among her volumes of poems are *Passion Flowers* and *From Sunset Ridge;* her prose writings include *A Trip to Cuba,* her fascinating *Reminiscences,* and *Sex and Education.*

JULIA WARD HOWE

Mrs. Howe was born in New York City, but spent much of her life in Boston. She retained her brilliant intellectual powers and quick wit and humor to the last, dying at the age of ninety-one, one of the most revered women of her time. One of the stories which shows her famous use of repartee tells of her acknowledgment of a card: "Greetings to Boston's greatest Trinity—Howe, Higginson and Hale." "Well," she exclaimed, "they can't say that we drop our 'H's' in Boston."

HOWE, the family name of two British soldiers, brothers, both of whom fought for England in the struggle with the American colonies.

Richard Howe, Earl (1726-1799), was one of England's distinguished naval officers during its numerous wars of the eighteenth century.

He began his career on the sea when a lad of fourteen, and six years later, while commanding the *Baltimore,* was wounded in a desperate fight with two French privateers off the west coast of Scotland. During the wars which followed, that of the Austrian Succession and the Seven Years' War, he rose steadily in fame and position, and when the American Revolution broke out he was created vice-admiral. In 1776 he was given chief command of the British fleet in American waters, where he coöperated with his brother, General William Howe (see below). After the close of the Revolutionary War Howe was made First Lord of the Admiralty, and in 1793, when England and France opened hostilities, he took command of the Channel fleet. The following year he won the great victory known as that of "the glorious first of June," and was made a Knight of the Garter by George III. Three years before his death Howe was created admiral.

Sir William Howe (1729-1814), younger brother of Admiral Howe, saw his first military service in Flanders, at the age of seventeen. During the French and Indian War, having risen to the rank of lieutenant-colonel, he fought at the siege and capture of Louisburg and was one of General Wolfe's officers in the attack on Quebec (see QUEBEC, BATTLE OF). Three years before the outbreak of the American Revolution he was promoted to the rank of major-general, and in March, 1775, was sent with reënforcements to the relief of General Gage at Boston. Howe led the British at the Battle of Bunker Hill, and in October, 1775, succeeded Gage as chief in command of the British army in the colonies. Though he was successful in his campaigns of 1776 and 1777, winning the battles of Long Island, White Plains and the Brandywine, and occupying Philadelphia, he did not accomplish the defeat of the American cause, as he had hoped to do, and in 1778 was succeeded by Sir Henry Clinton. Howe was rewarded with the rank of full general in 1783.

HOW'ELL, CLARK (1863-), editor of the Atlanta (Ga.) *Constitution* and one of the leading public men of America. He was born in Erwinton, S. C., but his childhood was spent in Atlanta, where he attended the public schools and where he has since lived. When he was twenty years old he was graduated from the University of Georgia, and immediately went into newspaper work under direction of his father, on the *Constitution.* He was at first night city editor; when Henry W. Grady died he succeeded him as managing editor; and when his father, who was editor-in-chief, retired in 1897, the son took his place.

Clark Howell has been a member both of the state house of representatives and of the senate, and was for years a member of the national Democratic executive committee from Georgia. He is also a trustee of the University of Georgia. He has figured conspicuously in many political campaigns, one of the most memorable of which was the campaign in 1906, in which he contended against Hoke Smith for the Democratic nomination for governor, and was defeated. People in Georgia believe that that campaign will be remembered for at least fifty years. Howell is well known throughout the South as an eloquent and forceful public speaker, and is in demand as an orator.

HOWELLS, WILLIAM DEAN (1837-), a novelist, poet, editor and literary critic, the high and enduring character of whose writings give him undisputed claim to the title "dean of American letters." The founder of the late nineteenth century school of realistic fiction, he has made the most permanent contribution to the development of the American novel of any writer of his time. He is a prolific, although a very deliberate, author; almost every year since 1871 he has published a book.

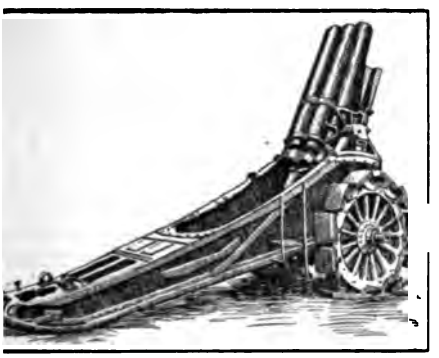
WILLIAM DEAN HOWELLS

Howells was born in Martin's Ferry, Ohio. His father owned and published newspapers in Hamilton and Dayton, Ohio, and the son learned the printer's trade, and, by degrees, the whole business of managing a daily paper. In one of his books, *Impressions and Experiences,* he recounts his experiences of this apprenticeship in a very charming essay. He presents his impressions of his sojourn in Venice, during his consulship in 1861-65, in a book entitled *Venetian Life,* which reveals his aptitude for literary work. His subsequent residence in New York City as writer for the *Tribune* and the *Nation* prepared him still further for his fiction writing. In 1871 he became assistant editor of the *Atlantic Monthly,* and in 1886 joined the staff of *Harper's Maga-*

To the latter periodical he has for years ibuted charming, informal comments on ry and other topics of the day, under aption "The Editor's Easy Chair."

i first novel, *Their Wedding Journey,* is a of two very human lives. Its homeli- and pleasant, everyday character secured ; wide popularity. It was followed by a succession of novels. His *Rise of Silas am* is a broadly American novel, fraught kindly human sympathy. His *Hazard of Fortunes* is a story of the dramatic un- of current conditions in a big city. His i include *The Elevator, The Sleeping Car, Mouse Trap* and *The Register.* He has written many essays and some poetry, but st known as a novelist. Among his most rtant novels are *A Modern Instance, A one Conclusion, The World of Chance, of a Play, Ragged Lady* and *The Ken- Years of My Youth,* a volume of remi- ices, was published in 1915. C.W.K.

WITZER, *hou'it ser,* a form of cannon ied to throw a shell at a high angle, so its fire reaches soldiers protected from ; shots by fortifications and entrench- s. Howitzers are intermediate between and mortars, being longer in proportion eir caliber than the mortar, and shorter the gun. During the War of the Nations reat destructive power of huge siege how- was appalling. The projectiles from the



HOWITZER
ze of great gun used by the Germans in the of the Nations.

powerful of these monsters plowed their through the thickest concrete walls and out great holes in the earth below. The used against fortifications are filled with explosives, while those used in searching renches carry shrapnel.

WLERS, a name applied to a group of ican monkeys which utter sounds prob- ably as hideous as ever were heard in a forest or zoo. These monkeys live chiefly in the tropical forests of Brazil, Venezuela and Mexico, and are of large size, with human-looking, rounded heads, projecting muzzle, and face surrounded by a fringe of hair. The fur is red-brown, brown or black, and the long tail is adapted for holding or grasping. The extraordinary voice of the howlers, which makes the woods echo with most unpleasant sounds at early morning and at evening, is due to the inflation of a bone in the throat into a hollow drum, which communicates with the larynx. Howlers feed on fruit and leaves. They are the largest monkeys of the western hemisphere. See MONKEY.

HUBBARD, ELBERT (1850-1915), a picturesque figure in modern American letters, who won success as an advertisement writer, lecturer, publisher, editor and essayist, but who became most widely known as the founder of the "Roycroft Shop" in East Aurora, N. Y. This is an establishment where artistic books are produced and various handicrafts are practiced, including basket-making, the fashioning of articles from hammered brass, and furniture-making. "Fra Elbertus," as he was accustomed to style himself, was born in Bloomington, Ill., and educated in the common schools. A vigorous and independent thinker, whose vein of sarcasm was often tempered by his kindly philosophy and his whimsical sense of humor, he attracted wide attention as publisher of *The Philistine* ("a magazine of protest") and *The Fra,* the organ of the Roycrofters. The former, devoted to philosophy and criticism, always interested the reader and as often startled him because of its frank, sometimes immodest, tone, and its freedom from convention. In *The Fra,* an open forum for the courageous discussion of all sorts of subjects, Elbert Hubbard's forceful, epigrammatic style was seen at its best.

ELBERT HUBBARD

Among his best-known writings are a series of *Little Journeys* to the homes of authors, musicians, artists and philosophers; these

sketches are much admired for their excellence of form, but are not always accurate in content. Of his numerous essays, the most widely read is *A Message to Garcia,* a stirring account of a bold exploit connected with the Spanish-American War and a few lessons drawn from it. Several million copies of this essay have been circulated. It is now included in a volume containing among other essays, *The Cigarettist, Get Out or Get in Line* and *Pasteboard Proclivities.* Hubbard was also a popular lecturer, one who talked just as he wrote. His varied and interesting career came to an end in June, 1915, when he lost his life through the sinking of the steamship *Lusitania.*

HUCKLEBERRY, *huck''l ber i,* or **WHORTLEBERRY,** *hwur't'l ber i,* a shrub belonging to the heath family, of which several species are known. The common swamp huckleberry bears slender, spreading stems, sometimes ten feet or more in height, white, bell-shaped flowers, and small oval or wedge-shaped leaves. Sweet, juicy berries, blue-black in color and containing a few small seeds, constitute the fruit of this species of huckleberry. Another familiar species, the low-bush huckleberry, grows to a height of from one to three feet on low or rocky ground. Huckleberries are found from New England to the Rocky Mountains and in all but the extreme Southern states.

THE HUCKLEBERRY
A branch, showing how the berries grow.

The Blueberry. Several species of blueberries are popularly known as huckleberries in many localities. The blueberry is common in Great Britain, in Europe and throughout North America. There are two main divisions, the high-bush and the low-bush, the former varying in size from five to ten feet, and the latter, from six inches to three feet. Different species bear fruit of various colors—black, blue, white and red.

The market blueberries of the United States and Canada are the fruit of a shrub that grows on dry, sandy hills from New Jersey northward, and in the northern tier of counties in Minnesota and the adjoining Canadian provinces. Nearly all of the product used by the people in the central part of the United States is obtained from the Minnesota tracts. In Maine there is a great field of 150,000 acres, known as the "blueberry barrens," from which about 720,000 cans of berries are obtained each year. The berries are picked by hand, the pickers receiving from a cent and a half to three cents a quart. Occasionally a tract of land is burned over so as to clear the ground for new bushes, and the season before the burning the berries are often gathered with a berry rake. This implement is similar to a deep dustpan with a bottom containing teeth like those of a comb, and can only be used when injury to the bushes does not have to be considered.

Uncooked blueberries are served as a dessert, and this fruit is also used in making pies and other pastry, and is made into preserves, jellies and wine. In any form they are nutritious and palatable.

HUD'DERSFIELD, the chief center of English cloth and woolen manufacture, a city in the north-central part of England, in West Riding, Yorkshire. It was the first English city to adopt an eight-hour labor law and the first to own and operate its street cars, gas, water and electric plants. It is an old town, having been entered in the Domesday Book (which see), but did not become industrially important until the eighteenth century, when woolen manufacturing was introduced. The city is situated on the Colne River, about sixteen miles southwest of Leeds, and is connected with other important commercial cities by rail and water. It has broad, well-built streets and fine buildings, the market and town hall being notable among the latter. With beautiful parks, an art gallery, public baths and libraries, a modern sewerage and garbage-disposal system, dwellings for married and single working men and women, splendid churches and educational institutions, among them a collegiate school affiliated with London University, Huddersfield is an attractive city. In 1911 it had a population of 107,825.

HUD'SON, HENRY (? -1611), a British explorer whose great work, entitling him to lasting recognition, was accomplished under the Dutch flag. He explored the Hudson River, Hudson Bay and Hudson Strait, all of which were named for him. In 1607 he sailed from London on an unsuccessful voyage in a ship manned by ten men and a boy to discover the northeast passage, and cruised beyond the eightieth degree of latitude. After two later

ss on the same mission, which were also ss, he sailed for North America in 1609 ttle vessel called the *Half Moon,* in the y of the Dutch East India Company, and ed the Hudson River. In 1610 he ked in the *Discovery,* in search of a vest passage to Asia. It was on this trip Hudson Strait and Hudson Bay were dis- d. During the winter on Hudson Bay ew suffered many hardships and finally ied. Hudson and his son were set adrift oat with seven loyal sailors, and were heard from again. In 1909 the three edth anniversary of the discovery of the n River was celebrated in New York See NORTHWEST PASSAGE.

SON, N. Y., a city on the Hudson River, ie county seat of Columbia County, situ- n the southeastern part of the state, 114 north of New York City and twenty-nine south of Albany. It is on the New York l & Hudson River and the Boston & y railroads, and on the Albany & Hudson c railway. It is also served by ferries cross the river to Athens and is at the of navigation for river steamboats. The tion, which in 1910 was 11,417, was 12,- 1916, according to a Federal estimate.

son lies on the east side of the river, and ly built upon the slope of Prospect Hill, rises from a steep bluff above the boat g. The higher ground commands a fine f the Hudson Valley, the Catskill Moun- rest, and the Berkshire Hills east. Among ore prominent buildings are a Federal ig, completed in 1913 at a cost of $75,000; nty courthouse, city hall, state armory, library and a hospital. In the city are a training school for girls, a state firemen's home, an orphan asylum and a home for the aged.

The industrial enterprises include two large cement mills, one of which is among the largest in the United States, and manufactories of knit goods, car wheels, lumber, tobacco, iron, ice machinery and tools, sash and blinds, and steel springs.

In 1783 the first settlement was made by New England merchants and fishermen. The present name was adopted in 1784 in honor of Henry Hudson, and a year later the town received a city charter. In the early days it was engaged in foreign trade and the whaling industry, but its shipping was destroyed by the War of 1812.

HUDSON BAY, formerly HUDSON'S BAY, is Canada's great land-locked sea. It forms, with its southern arm, called James Bay, a body of water 900 miles long and 500 miles wide, and has an estimated area of 400,000 square miles, over four times that of all the Great Lakes. It may be regarded as an arm both of the Atlantic and of the Arctic Oceans, for it communicates with the former through Hudson Strait and with the latter through Fox Channel and various other passages. In the past Hudson Bay has been known principally as the last discovery, in 1610, of the great Dutch navigator whose name it bears, and as the starting point of the fur-trading activities of the Hudson's Bay Company. Now, however, its shores are being brought into touch with civilization by the building of railroads, and its waters are becoming a great highway for ocean steamships.

HUDSON BAY AND ITS RAILROAD

Navigation in Hudson Bay, however, is subject to inconveniences and even dangers. For more than half the year ice entirely prevents navigation, and there is further difficulty in

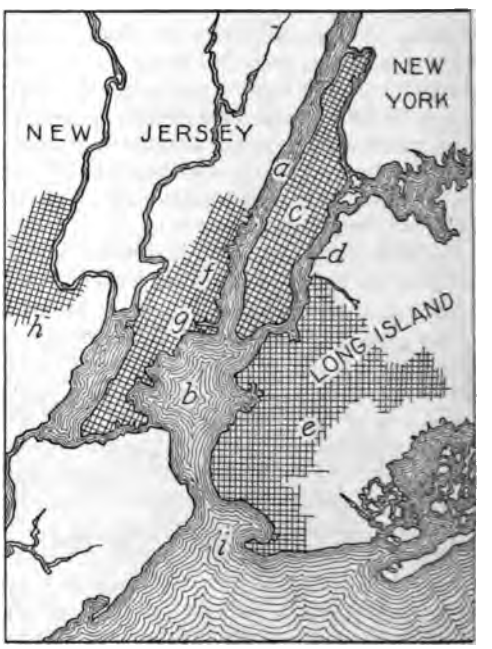
that the nearness of the north magnetic pole makes mariners' compasses unreliable. Even from the earliest days, however, sailing ships have made their way into the bay and out again, and now their old routes are being taken by great steamships. The shores of the bay are not inviting to settlers, and are not likely to be productive. On the west they are low and level; on the east they rise in rocky bluffs. Minerals are known to exist both east and west of the bay, and there is some timber, but most of it is too small to be commercially valuable. James Bay (which see) is in the same latitude as the cities of the Canadian prairies, and the lands south and west of it are thought to be suitable for dairy farming. About thirty rivers empty into Hudson Bay, the most important, the Nelson and the Churchill (both of which see), forming excellent harbors at their mouths.

The Hudson Bay Railway. The fact that Port Nelson, on Hudson Bay, is as near to Europe as Montreal, and a thousand miles closer to the grain-growing and cattle-raising prairies of the west, has led the Canadian government to construct a railroad to it from The Pass (Le Pas), Manitoba, where connection is made with the Canadian Northern Railway. Hudson Bay itself is never frozen, but, except from three to five months of the summer, ice blocks Hudson Strait and closes the bay. Nevertheless, it is believed that the grain and cattle shipped to Europe in these few months when navigation is open will render profitable the 424 miles of railway, which approached completion in 1917.

Other railroads to Hudson Bay are planned, among them the extension of the Timiskaming & Northern Ontario (the Ontario government railway) from Cochrane to James Bay, a distance of about 150 miles. Provision has also been made to give the Ontario government a strip of land five miles wide through Manitoba to Port Nelson, so that the railway may eventually be continued to that point. C.H.H.

HUDSON RIVER, frequently called the "Rhine of America," is one of the most important rivers in the United States, because of its beauty, historic interest and commercial value. It is, however, only 300 miles in length, and lies entirely within one state, but that state is New York, and the city which lies at the mouth of the river has become the great metropolis of the western hemisphere.

In the wildest part of the Adirondacks, 4,322 feet above sea level, lies a little lake with the romantic name of Tear-of-the-Clouds, and in this the dashing mountain stream which is the Hudson in its earlier stages takes its rise. It flows almost straight south, keeping near the eastern boundary of New York state, and empties into the Atlantic at New York City. In its upper course it is a small stream with a



AT THE MOUTH OF THE HUDSON

Reference (*a*) indicates the lower twenty miles of the course of the river; (*b*) is Upper New York Bay; (*c*) the island of Manhattan, once the entire territory of New York City; (*d*) East River; (*e*) Brooklyn, now a part of the greater city; (*f*) Hoboken, the terminus of most of the Atlantic passenger steamers; (*g*) Jersey City; (*h*) Newark; (*i*) Lower New York Bay.

rapid fall, and numerous small cities line its banks to make use of the water power. Emerging from the mountains, it flows through a region of no particular beauty until it enters the picturesque Highlands, about sixty miles below Albany. For sixteen miles its rather narrow valley winds between high and rocky shores of great beauty, and it is the fancied resemblance of these to the castled banks of the Rhine that has given the river its popular name. Farther on in its course—not much above the mouth—occur the Palisades, great perpendicular rock masses which constitute one of the chief natural beauties of the country.

Meanwhile, streams have been flowing into it, and one of these, the Mohawk, which empties into it just above Troy, carries a greater volume of water than the Hudson itself. But

ot this pouring in of tributary waters that
1 the lower Hudson such a deep, wide
a. In fact, from Troy downward to its
1 it is less a river than a drowned valley
rd, up which the tidal flow finds its way.
estuary is of sufficient size to permit the
t vessels to ascend to Albany, 144 miles
the mouth, while smaller boats easily
Troy, six miles farther. Traffic on the
is enormous, but all the vessels on its
s are by no means commercially em-
d, for few regions in the country are more
d by tourists than the Hudson, and luxu-
steamers have been built to accommo-
them. At its mouth, along the western
, across from Manhattan Island, are the
of the leading trans-Atlantic passenger
ers.

covered by Verrazano in 1524, the river
irst explored in 1609 by Henry Hudson,
hom it was named (see HUDSON, HENRY).
xcellent harbor determined the site of
York, and its shores saw some of the im-
nt conflicts of the Revolution. On its
s Robert Fulton launched the first success-
eamboat, and along its valley one of the
st railways on the continent was built.
y great railroads run parallel with it
gh much of its course, and aid in carry-
e vast quantity of merchandise which the
s to the west and north send to New

The valley of the Hudson is one of the
thickly-settled parts of the country, for
it are to be found many thriving cities
illages—Glens Falls, Cohoes, Troy, Albany,
on, Catskill, Kingston, Poughkeepsie,
urgh, Westpoint, Peekskill, Haverstraw,
ing, Nyack, Tarrytown, Yonkers and
s. T.E.F.

DSON RIVER TUNNELS. At the com-
ement of the twentieth century Manhat-
land, now the business heart of New York
was almost as completely isolated from
urrounding mainland as when the Dutch
t it from the Indians nearly three hun-
years earlier. There were bridges across
arrow Harlem River at the north, and the
Brooklyn Bridge to Long Island on the
but to reach the New Jersey shore on the
it was necessary to cross a mile of water
oat. Thousands of people whose daily
was in New York and the hundreds of
ands who came to the city each year from
outh and west were dependent on ferry
for their passage over the river. On foggy
and in the winter, when floating ice-cakes
obstructed the passage, there were many de-
lays, and most people preferred homes ten or
fifteen miles north or east to those a shorter
distance away in New Jersey.

In 1874 an unsuccessful attempt was made to
tunnel under the river. Even the much shorter
East River had no passage beneath it but a
gas tunnel ten feet in diameter, completed in
1894. But in 1902 a young lawyer, who had
come from Tennessee only ten years before,
became president of the Hudson & Manhat-
tan Railroad Company, a company which ac-
quired the rights to the abandoned tunnel.
Through the activity of this young man, Wil-
liam G. McAdoo, $70,000,000 were obtained for
a renewal of the undertaking. Franchises were
secured in both New York and New Jersey, and
two pairs of tunnels were driven under the
Hudson River, about a mile apart. The finan-
cial ability which Mr. McAdoo displayed led
later to his appointment as Secretary of the
Treasury under President Wilson.

There are now three pairs of tunnels to
New Jersey, and besides the gas tunnel there
are seven sets of tunnels, either in operation
or under construction (in 1916), to Long Island,
some double and some single. The first of the
McAdoo tunnels was completed in 1904, and the
first pair was put in operation in 1908. It con-
nects Jersey City with Morton Street, Man-
hattan, and is over a mile long. The inside
diameter of each of its tubes is fifteen feet
three inches. From the New York end a sub-
way runs north to the Pennsylvania Railroad
station and at the New Jersey end it is con-
nected with the southern pair, which runs from
Cortland, Church and Fulton streets in New
York, and is slightly longer. From the junc-
tion of the two tunnels a line of the company,
partly a subway and partly above ground, ex-
tends about ten miles west into Newark.

The Pennsylvania Railroad owns the other
tunnels under the Hudson River. They were
completed in 1910 and continue on under the
East River to Long Island. Their diameter
is twenty-one feet two inches. Some of the
other tunnels under the East River are a part
of the New York subway system. T.E.F.

HUDSON'S BAY COMPANY. Commercially
stated, this was a joint-stock association for
trading in British North America; in reality,
it played a very large part in the romance and
adventure of early days in that vast region.
The gloomy woods and the streams and lakes,
with their infinite variety of fur-bearing ani-
mals; the Indian guides and fur-hunters; the

canoes floating downstream for miles and miles past forests in which no white men had ever set foot—all these form part of the picture which the name of Hudson's Bay Company calls up.

As soon as it became known in England that the northern region around Hudson Bay was rich in fur-bearing animals, a company was formed to reap profit from it, and in 1670 Charles II granted to the company the "sole trade and commerce" of all those lands drained by streams flowing into Hudson Bay. Forts were established in the coast regions, and trade and barter with the Indians was begun. The Indians, with their love of brightness and color, were glad to exchange the beautiful, soft pelts for beads or printed cloth. The company became enormously wealthy, for the demand for furs was great in Europe.

The company's officials, however, had to contend with enemies. Parliament threatened to take from them their charter because they had built their forts and trading posts only in the coast region and had made no attempt to found settlements in the interior, as they had agreed to do. Then, too, the French in Canada were jealous of their good fortune and sent expedition after expedition against them; nor were matters bettered when, in 1763, Canada was surrendered to the English. Minor fur-trading companies sprang up in Canada proper, and these, joining forces, proved a serious rival to the original association to the north. While one company alone was bartering for furs, the Indians had perhaps been deceived as to the true value of their wares, and had been cheated, but the white men had done them no other harm; now, with two companies contending fiercely for trade, matters became worse and worse. As a bribe, both companies offered "fire water," or liquors, and the one which could supply this most freely got the trade. The solemn forests looked down on drunken Indians—a sight which never before had been witnessed—and on drunken white men as well, for not all the fire water was given away. And so anxious were the Indians to obtain this bribe that they killed animals in season and out of season, and there was danger that some of the most valuable species would be exterminated.

Finally, after years of strife, the two companies joined forces in 1821, and though seventeen years later the Hudson's Bay Company succeeded in acquiring the sole right again, their grant expired in 1859. From that time on, all trades had equal privileges. The Hudson's Bay Company did not disband, nor did it give up its original territorial rights until 1869, when it received from the British government about $1,500,000 for them. It is still a prosperous trading company, with a remarkably-efficient organization and high standards.

Consult Reed's *The Masters of the Wilderness* (a study of the Hudson's Bay Company); Bryce's *History of the Hudson's Bay Company*.

HUÉ, a fortified city and the capital of the kingdom of Annam, in French Indo-China, Southeastern Asia, situated on the Hué River about nine miles from its mouth. Fortified walls, five miles in circumference, surround the city. The royal palace, which is distinguished from other great buildings of the city by its yellow-tiled roof, contains a museum of ancient Annamite art. The splendid tombs of the old kings of Annam are in the vicinity. Hué is the seat of the French political resident. Thuan-an, the port at the mouth of the river, is occupied by French soldiers. Population, about 60,000. See ANNAM.

HUERTA, *hwair'tah*, VICTORIANO (1844-1916), a Mexican soldier and politician, the leading figure in the revolution which deposed President Madero in 1913. Huerta was a descendant of the Indian and Spanish races of Mexico, and was born of poor and obscure parents. One day, when a band of troops was passing through his native village of Cototlan, he was called upon by the commander of the company to act as his secretary. Impressed by the boy's ability and intelligence and by his expressed desire to become a general, the officer took the lad to Mexico City. He was placed in the National Military School at Chapultepec, and for thirty years after his graduation served in the army under President Porfirio Diaz, who raised him to the rank of brigadier-general.

VICTORIANA HUERTA

Diaz, for good reasons, distrusted his able general, but it was Huerta, then Minister of War, who saw that the deposed President, when exiled in 1911, had safe-conduct when he fled from the capital. During the administration of Madero, the successor of Diaz, Huerta was placed in command of the government troops

›press the insurrection of Felix Diaz, but ›n deserted the President and headed the ɐr-revolution which forced the latter's res- on. He himself became provisional Presi- five days later Madero was murdered, nably by Huerta's order, and the new ament set up by Huerta was denied recog- by the United States.

over a year he maintained his authority, te of the opposition of the United States ıf the Constitutionalists under Carranza. ›ril, 1914, the American flag was insulted mpico, an episode which all but involved ʍo countries in war, and led the United to occupy Vera Cruz. Meanwhile the itutionalists were making such headway umors of Huerta's resignation were soon ıt. On July 15, 1914, he gave up his and fled to Europe, where he remained the following spring. He then bought a farm on Long Island, near New York but after a few months started west, the pretense that he wished to visit the tion at San Francisco. His real object eclared to be to start a new revolt, and ly 3, 1915, he was arrested at El Paso, for violating the neutrality of the United . After six months' detention he died. [EXICO, subtitle *History*.

ʜH CAPET, *ka'pet* (939-996), the duke ncia and king of France from 987 to 996, st of the Capetian dynasty. It was not ıe was chosen king by the nobles as suc- to Louis V, the last king of the Caro- ı line, could it be said that "France has ıch king." His royal dominions, however, only one-twentieth part of the country ı now France. The house of Capet has 118 sovereigns to Europe, which include six to France, twenty-two to Portugal, to Naples and Sicily and five to Spain.

ʜHES, *huze,* CHARLES EVANS (1862-), ıerican jurist and statesman, one of the courageous, independent and progressive modern group of American public offi- and an unsuccessful nominee for the ency of the United States. He was born ɛns Falls, N. Y., and was educated at ɛ and at Brown universities, and at the ıbia Law School. His law practice, which ɐan in New York City in 1884, was inter- in 1891 by his appointment as professor at Cornell University. He resumed his ɛ in 1893, but for several years thereafter ı special lecturer at Cornell and at the ʃork Law School.

Hughes was brought prominently into public life in 1905, when he was appointed special attorney by the New York legislature to investigate the financial methods of the powerful life insurance companies of the state. The thoroughness with which he performed his task resulted in an awakening of public opinion and in far-reaching reforms, and led in 1906 to his election as governor of New York on the Republican ticket; he defeated his chief opponent, William Randolph Hearst, by 60,000 votes. Two years later he was reëlected. During his service as governor Hughes was engaged in a ceaseless fight for reform. Through his efforts a Public Service Commission Act was passed, and the race tracks of the state were closed. The struggle for direct primaries, begun by him, was long and bitter, but it bore fruit in 1913, when a law providing for that reform was passed.

CHARLES EVANS HUGHES

Before the end of his second term President Taft appointed him an Associate Justice of the Supreme Court of the United States, and he resigned the governorship in the autumn of 1910. Because of his determination to serve his country well as a member of the Supreme Court and remain aloof from the rancors of partisan politics, Justice Hughes consistently refused to allow the Republicans to use his name in connection with the contest for the Presidential nomination in 1916. Without encouragement from him, however, he was named as the party's standard bearer, and at once he resigned his judicial position. In the November election he was defeated by his Democratic opponent, President Woodrow Wilson. Within two months Mr. Hughes returned to the practice of law in New York City. E.D.F.

HUGHES, JAMES LAUGHLIN (1846-), a Canadian educator, for more than a generation a leader in the promotion of educational progress. In one capacity or another he was connected with the Toronto public schools for forty-seven years, from 1867 to 1914. Dr. Hughes spent his boyhood on the farm, in Durham County, Ont., where he was born. In 1866 he was graduated from the Toronto Normal

School, and in the next year was appointed a teacher in the Toronto Model School. In 1871 he became principal of the Normal School, and three years later was chosen chief inspector of schools for the city of Toronto. He resigned this position in 1914, after forty years of continuous service, to devote himself to writing and lecturing.

Dr. Hughes is well known throughout Canada and the United States as a lecturer, particularly on the kindergarten and other phases of modern education. He was the first Canadian lecturer and teacher at Chautauqua Institution, New York, and was for many years a leader in Canadian Sunday-school work. He was president of the Elementary Department of the Educational congress held in connection with the World's Columbian Exposition at Chicago in 1893, was a delegate from Canada at the British Empire League in London, England, in 1894, and again represented Canada in 1906 at the organization of the League of Empire in London. His reputation was further enhanced by his writings on education, including *Froebel's Educational Laws; Dickens as an Educator; Mistakes in Teaching; Attention and How to Retain it;* and *What Adulthood Should Do for Childhood.* G.H.L.

HUGHES, Lieutenant-General Sir Sam (1852-), a Canadian soldier and political leader, the organizer of the Canadian troops for service in the War of the Nations. Sir Sam's interest in military matters came naturally enough, for both his grandfathers were soldiers in the British army, and a great-grandfather was a French general under Napoleon at Waterloo. Like his elder brother James, he was born on a farm in Durham County, Ontario, where he spent his boyhood. At fourteen he enlisted in the militia to defend Canada against the Fenians, and thereafter was active in the militia for thirty years. Three years later, in 1869, he was graduated from the Toronto Normal School. He taught school for several years, worked in a railway office in Milwaukee, Wis., for a year, and then for a short time was engaged in mercantile life in his native county. After studying law for a year in Toronto, he became teacher of literature and history in the Toronto Collegiate Institute, a position he retained for several years.

SIR SAM HUGHES

About 1885 he determined to enter public life, and as the first step, in that year purchased the Lindsay *Warder,* which he edited until 1897. He was elected to the Dominion House of Commons as a Conservative in 1892, and has represented Victoria County, Ont., since that date. While taking an active interest in public affairs generally, he continued to make a special study of military affairs. He was the first man in the British Empire to suggest that the colonies should assist the Mother Country in the South African War. During the war he fought as a British officer on the staff of Sir Henry Settle, and earned high commendation for courage and resourcefulness from Lord Milner, then High Commissioner for South Africa.

In 1911 he became Minister of Militia and Defense in the Cabinet formed by Sir Robert Borden. Immediately he took steps to develop the cadet system in Canadian schools, and to train the militia according to the most efficient, up-to-date methods. He took with him the leading officers from various parts of the Dominion to witness the annual maneuvers of the armies of Great Britain, France, Germany and Switzerland, and in other ways tried to improve the spirit and efficiency of the militia. At the outbreak of the war in Europe he established in Canada four of the largest camps in the world for training in all branches of military service. As a result he was able, six weeks later, to send a well-trained and well-equipped division of 33,000 men to England, and during the next two years he was responsible for the organization of an army of nearly 400,000 men. Although it was generally admitted that no other man could have accomplished as much in as short a time, Sir Sam was bitterly criticized for his methods, which were called dictatorial. Differences of opinion also arose in the Cabinet and finally resulted in Sir Sam's resignation late in 1916. G.H.L.

HUGHES, Thomas (1823-1895), an English author who had the ability to portray incidents of the daily life of the typical English schoolboy with a sympathy and insight that make his stories a revelation of boy nature. The book which won him distinction was *Tom Brown's School-Days,* published in 1856. The bulk of his literary work is insignificant when

ured with this one celebrated book. Mr. es was only ten years of age when he was o the famous school at Rugby, and *Tom* s is a product of his personal impres-

enjoyed a long public career, as advanced al in Parliament and as one of the ers of the Christian Socialists, and he ed a great deal of time to the social uplift e working class, particularly through the n of coöperation. *Vacation Rambles* is lection of sketches which he wrote to r his expenses on little Continental trips, hese sketches served as his apprenticeship ting. *The Scouring of the White Horse* is ly account of one of his vacation trips. ntinued his favorite hero's career in *Tom s at Oxford,* which was first published as al in Macmillan's Magazine. His other include *The Memoir of a Brother, The iness of Christ, Alfred the Great,* and a n of Rugby, Tennessee.

GLI, or **HOOGLY,** *hoo'gli,* a river of al, India, the principal channel through the Ganges reaches the sea, formed by nion of three rivers of the Nadiya dis- Including its estuary, the Hugli is about niles long. It is shallow above Calcutta empties into the Bay of Bengal. Com- ally this is the most important channel of anges, for it is the one most easily navi- . Large boats can ascend to Calcutta, y-six miles from the sea. See GANGES.

'GO, VICTOR MARIE (1802-1885), a French novelist and dramatist, one of the com- ing figures in the world's literature. As ter of fiction the world knows him best e author of that great epic of the human *Les Miserables.* Those who look for per- n of construction, proportion and sym- in a novel will find none of these ies in *Les Miserables.* This story of Jean an, a man raised from the depths of sin legradation, purified and transfigured by ing, is a masterpiece of emotional and ptive writing, a lyric-epic in prose. When s published, in 1862, it appeared on the day in ten different languages, and it s widely read. The book is described its title in these volumes.

tor Hugo was born at Besançon, on Feb- 26, 1802, the son of a distinguished gen- who served in the army of Napoleon arte. The boy was educated in Madrid n Paris, and he grew up passionately ed to the principles of the royalists and in the Roman Catholic faith. His poetic genius was revealed in his early odes and ballads, published before he was twenty-five, and when, in 1830, his tragedy *Hernani* was produced in Paris, he was hailed as the great leader of the Romanticists (see ROMANTICISM). This was followed by several other plays, notably *Marion Delorme, The King Amuses Himself, Lucrèce Borgia, Ruy Blas* and *Les Burgraves;* but with the presentation of the latter, in 1843, Hugo became convinced that his conceptions of the drama were too lofty for the limitations of the state, and he abandoned his dramatic career.

VICTOR HUGO

The greatest French writer of his century. The sublimity and splendor of his imagination and his mastery of language rank him with Shakespeare, Milton and Dante.

In 1829 he gave to the press his first important work in prose fiction, *The Last Day of a Man Condemned to Death,* a fervent protest against capital punishment. *Notre-Dame de Paris,* a great historic and romantic poem in the form of a prose narrative, with its wonderful picture of Paris in the time of Louis XI, followed in 1831. Three years later appeared the novel *Claude Gueux,* another eloquent plea against capital punishment, and then came several volumes of poems, revealing the author's growing sympathy for democratic ideals. In the year 1841 he was elected to the French Academy.

The decade between 1843 and 1853 was a period of political activity for Hugo. In 1845 he was made a peer of France by Louis Philippe, and the following year delivered his first speech in the House of Lords, or upper chamber of the French Parliament. On the outbreak of the Revolution of 1848 he gave his support to Louis Napoleon (later Napoleon III). When the latter ceased to favor his advancement he became one of the leaders of the democratic faction, and after Napoleon's seizure of power, in 1851, Hugo was one of those who continued the struggle against that tyrant. Forced to flee from France, he went to Brussels and then to the island of Jersey, in the English Channel. From this retreat he was expelled with other French exiles by the

English government in 1855, and finally settled on the island of Guernsey, where he remained until 1870.

In his *Napoleon the Little* and *History of a Crime,* written in the first year of his exile, Hugo gave vent to his indignation over the manner in which the Second Empire under Napoleon III was founded. During his sojourn in the Channel Islands he wrote, among other works, the first part of his *Legend of the Centuries,* an epic which in nobility and beauty rivals Milton's *Paradise Lost* and Dante's *Divine Comedy;* it was here also that he wrote the matchless *Les Miserables* and two other well-known novels splendid in imaginative power, *The Man Who Laughs* and *Toilers of the Sea.*

In 1870 France began its disastrous war with Germany (see FRANCO-GERMAN WAR), and the empire of Napoleon III was soon tottering to its fall. In the troubled days that followed, Hugo took his seat in the National Assembly, which met at Bordeaux in 1871. Resigning in March of that year, he went to Brussels, from which he was expelled because of his defense of the Paris Commune (see COMMUNE). Soon after he returned to Paris. In 1872 he published his *Terrible Year,* a volume of verse recording the downfall of the empire, so noble in spirit and so majestic in expression that it even glorified disaster. His last great romance, *Ninety-three,* an historic novel of the year 1793, appeared in 1874, but volumes of verse came from his pen until nearly the end of his life.

He died on May 22, 1885, and his funeral was a great public pageant as magnificent as was ever accorded a king. He lies buried in the Pantheon, the noble edifice in Paris devoted to the interment of the illustrious men of France. B.M.W.

Consult Swinburne's *Study of Hugo.*

HUGUENOTS, *hu'ge nots,* a term of doubtful origin, applied by the Roman Catholics to the Protestants of France during the religious struggles of the sixteenth and seventeenth centuries. The Huguenots drew their inspiration from Calvin, and were at first bitterly disliked by the court and the bulk of the people of France. Under Henry II, 1547-1559, the Protestant party grew strong, and persecution began. Under Francis II the Huguenots became a political force and included within their ranks Henry of Navarre, his brother Louis, the Prince of Condé, Admiral Coligny, and many others of high rank and great ability. At the head of the Roman Catholics stood the Guises, who employed their influence with the weak young king against the Protestants.

Upon the accession of Charles IX, the government was administered by the queen-mother, Catharine de' Medici, who encouraged the Protestants in the free exercise of their religion, in order to curb the power of the Guises. But the bitter feelings of both parties plunged the country into the miseries of a civil war. Catharine, fearing then that Protestantism might become a permanent power in the country, suddenly made an alliance with the followers of the Duke of Guise, and together they carried out the dreadful Massacre of Saint Bartholomew's Day, August 24, 1572. In the reign of the feeble Henry III, the Huguenots, under the leadership of Henry of Navarre and the Prince of Condé, became very powerful; and the king and Catharine were compelled to make humiliating concessions which resulted in the "War of the Three Henries." Finding himself at the mercy of the Guises, Henry III caused the assassination of the Duke of Guise and the cardinal of Lorraine. This crime excited a violent outbreak, and to resist the opposition against him the king allied himself with Henry of Navarre and the Huguenots.

After the assassination of Henry III, the king of Navarre assumed the throne. However, it was not until he had embraced the Roman Catholic faith, in 1593, on advice of his minister Sully, that he was able to enjoy quiet possession of his kingdom as Henry IV. In 1598 he issued the famous Edict of Nantes, which conferred upon the Huguenots liberty of conscience and admission to all offices of honor and emolument. The Huguenots now formed a kind of republic within the kingdom, which Richelieu, who looked upon it as an obstacle to the growth of the royal power, determined to crush. Despite the assistance of Charles I of England, the Huguenots were compelled to yield to the forces of Richelieu, and Rochelle, as well as other Huguenot towns, surrendered.

Under the ministries of Richelieu and Mazarin, however, the Huguenots were still allowed freedom of conscience. Later, Louis XIV, through the influence of Madame de Maintenon, revoked the Edict of Nantes. This was followed by a terrible persecution, over 100,000 Huguenots being driven out, to carry their industry, wealth and skill to other countries. Louis XV, also at the instigation of the Jesuits, issued a new edict to repress Protestantism,

so strong had the spirit of toleration ne that it was revoked. The French lution for the first time gave the Protes- in France equal civil and political rights Roman Catholics, but the *recognized* stant Church was not permitted to hold s or general assemblies until 1872. French stants now number approximately 700,000, ave about 1,400 places of worship.

sult Thompson's *The Wars of Religion in e;* Willert's *Henry of Navarre and The enots in France.*

ated Subjects. The following articles in volumes contain information which bears the subject of the Huguenots:

rine de' Medici	Guise
es (France)	Henry (France)
ıy, Gaspard de	Nantes, Edict of
e, subtitle *tory*	Saint Bartholomew's Day, Massacre of

LL, the county town of Ottawa County, ec, situated in the southwestern part of rovince, at the confluence of the Gatineau Ottawa rivers. Ottawa, the capital of the inion, is on the south bank of the Ottawa ', directly opposite Hull, with which it is ected by two suspension bridges. Transtion is provided by the Canadian Pacific ray, and an electric tram extends to va and Aylmer. Both the Gatineau and Ottawa rivers are important logging ns, and Chaudiere Falls, on the Ottawa ', provide power for the city's manufac- which are growing rapidly. The products le watches, sulphur, sulphite, pails, pulp, ', Portland cement and packed meats. city has a park, a $30,000 post office and man Catholic College, the equipment of cost $600,000. The first settlement was in 1804, but the city was not incorpo- until 1893. It was almost completely oyed by fire on April 26, 1900; but has rebuilt, and now has adequate protection st fire. The population in 1911 was ; in 1916 it was estimated at 20,000, the rity being French-Canadians. H.B.

LL, or **KINGSTON-UPON-HULL,** for 600 years one of England's chief cities, ranks third among its river ports. The ge annual value of its imports exceeds 0,000 ($100,000,000) and its exports £16,- 0 ($80,000,000). It is an important cipal and parliamentary borough and y of itself, situated in the East Riding orkshire, on the west side of the Hull, e that river discharges into the estuary ie Humber. Shipbuilding yards are in operation, where ironclads have been constructed for the English as well as for foreign governments. The staple industry is seed-crushing for oil and cake-making. Here are also to be found extensive foundries, tanneries, breweries, flax and cotton mills and chemical works; but the city's importance arises chiefly from its shipping, its docks ranking among the largest in the world.

Among its principal buildings are Trinity Church, built in 1412; a town hall, a market hall and the corn exchange. It was important long before it received its charter from Edward I in 1299. Population in 1911, 278,028.

HULL, WILLIAM (1753-1825), an American soldier whose surrender of Detroit to the British during the War of 1812 overshadowed a military career that was otherwise a credit to him. He was born in Derby, Conn., and educated at Yale College. In 1775, after completing law studies at Litchfield, Conn., and passing his bar examinations, he joined the colonial army as a captain, taking part in the battles of Trenton, Princeton, Saratoga, Monmouth and Stony Point, and rising to the rank of lieutenant-colonel. After the war he removed to Massachusetts and was elected to the state senate; in 1805 he became governor of the territory of Michigan.

Hull was promoted to the rank of brigadier-general early in 1812, and was given command of the army in the Northwest. Soon after the outbreak of the War of 1812 he invaded Canada, but accomplished nothing, and in August, having recrossed the border, he surrendered Detroit to General Brock, after a weak resistance. It has been charged that he showed such great haste to surrender that instead of waiting for a white flag of truce to be found he seized a tablecloth and waved it over the walls of the fort. His act caused general indignation, and a court-martial, held in March, 1814, ordered him to be shot, a sentence later remitted by President Madison. Hull's defenders say that the blame for the conduct of the campaign in the Northwest should have been shared by the administration at Washington.

HULL HOUSE. Down in the heart of the foreign center of Chicago is a social settlement known as Hull House, which was established by Miss Jane Addams and Miss Ellen Starr in 1889 for the purpose of broadening the interests of and providing wholesome recreation and practical instruction for the poor people living in its vicinity. It was one of the first of its kind in America, and has become the

most famous of these enterprises. At the outset Miss Addams secured ample financial coöperation, and in this respect Hull House has been fortunate. It is under the active management of Miss Addams, who has been called the "first citizen of Illinois," and she is assisted by resident workers, who are educated and devoted people. Some of these live in the main building, around which are grouped the other buildings; these contain a gymnasium

HULL HOUSE

At the corner of Halsted and Polk streets, Chicago; a monument to the organizing genius of Miss Jane Addams.

with baths, a restaurant, boys' club rooms, working girls' club rooms and a fine theater in which the people of the neighborhood give amateur plays.

For eight months of the year, beginning in October, instruction in industrial work makes Hull House a busy center of activity. Printing and bookbinding, sewing and cooking, woodworking, metal-working, spinning and weaving are some of the lines of work taught in the institution. Classes offering instruction in geography, literature, music and art are well attended, and classes in other subjects are formed as the need for them is seen. Dancing, gymnasium work and athletic sports offer wholesome recreation for young people, and good lectures are given to interest both young and old. During the summer months the settlement aids in giving its people outings in the country. Miss Addams has been the guiding genius in this work, which directly influences about 9,000 people every week. Much of the interesting life in the institution is described in her book, *Twenty Years at Hull House*. See ADDAMS, JANE.

HUMANE, *hu mayn'*, **SOCIETIES**, the popular name for organizations having for their purpose the prevention of cruelty to animals, the prevention of cruelty to children, and the protection of birds. The first organization for the protection of animals was formed in England in 1824. In 1866 the first American society was formed in New York through the influence of Henry Bergh (which see). Within the next few years similar societies were formed in other states, and in 1875 the New York Society for the Prevention of Cruelty to Children was organized, also through the influence of Mr. Bergh. Within the next five years similar societies were organized throughout the country. In 1877 a federation of the societies for the prevention of cruelty to animals and the societies for the prevention of cruelty to children was formed under the name of the American Humane Association, which became a national organization, and had for its main purpose the treatment of animals transported long distances on railroads. Through the influence which this association brought to bear upon Congress, laws were enacted requiring better stock cars and the unloading of stock in transit once in twenty-four hours for food, water and rest.

The Royal Humane Society of England was founded in 1774, and had for its purpose the recovery of persons who were nearly drowned. The society is still in existence and has for its motto "A small spark may perhaps lie hid." See CRUELTY TO ANIMALS, SOCIETY FOR THE PREVENTION OF.

HUMAN PERIOD, or **AGE OF MAN**, also called the PRESENT PERIOD, is that division of the Cenozoic Era in geologic time which extends from the Glacial Period to the present time. The Glacial Period came to an end with the disappearance of the ice sheet from the great area which it covered. With the removal of this great weight from the land, there seems to have been a slight elevation of the continents, but in the main the area, form and position of the continents were practically the same as at present. With the development of climatic conditions there was a corresponding development of plant and animal life as we find them to-day. See GLACIAL PERIOD.

But the great distinguishing feature of the Human Period has been the invasion of the temperate and cool zones by man, who in these regions has developed the science and art of agriculture, and thereby changed many conditions of soil and with them modified plant and animal life. See MAN.

We are liable to think that in the present era geological changes have ceased, but such is not the case. Volcanoes are still active; glaciers are still changing mountain valleys; erosion is constantly taking place wherever rain

and streams flow; in some places the sea- is slowly settling, while in other places it ing. The changes taking place, however, hiefly on the surface of the earth, and con- ntly are more appropriately described un- physical geography or physiography than r geology. See PHYSIOGRAPHY.

M'BER, a river in England, flowing be- n the counties of York and Lincoln and ying into the North Sea on the east coast. his the Norsemen invaded the country ie ninth and tenth centuries. With its taries, the Trent and Ouse, which rise ie north and central parts of the island, Humber forms an important water sys- for exporting and importing raw and ufactured products. Varying from one to 1 miles in width, it is navigable for the st steamers for about half of its forty- course. Hull and Great Grimsby are the most important cities on its banks.

MBERT I (1844-1900), king of Italy, eld- on of Victor Emmanuel II, was born in 1. In 1866, during the war between Prus- nd Austria, he commanded a division of Italian army and served with skill and ry. In 1868 he married his cousin, Mar- te of Savoy, and succeeded to the throne ie death of his father in 1878. The most ble event of his reign was the formation in of the Triple Alliance, between Italy, ria and Germany, which existed until Italy sed the Germanic powers in 1915 in the of the Nations. This alliance resulted in y taxation of an already financially de- ed country and tended to lessen the popu- Humbert had achieved during the early of his reign. Two unsuccessful attempts made upon his life, one at Naples, in and another near Rome in 1897. On July 00, he was killed by the anarchist Bresci. present king, Victor Emmanuel III, is the lson of Humbert.

MBOLDT, *hum'bolt,* the judicial center e district of the same name, in the south- part, but near the northern limit of the t-growing section, of Saskatchewan. It is visional point on the Canadian Northern ay, situated about midway between ipeg, 425 miles southeast, and Edmonton, niles northwest. Saskatoon is sixty miles

The railroad has a large roundhouse en miles of tracks here. The largest in- ial plants are flour mills, grain elevators, eries and lumber yards; the creameries an annual output of about 250,000 pounds. The $65,000 post office, the town hall, the courthouse and land title building, erected at a cost of $110,000, and an $80,000 public school, are noteworthy buildings for a town of its size. For recreation, Humboldt has a park, a race track and curling and skating rinks. The place was settled in 1904, and the town was incorporated in 1907. The population in 1911 was 859; in 1916 it was estimated at 1,200, about one-half of these being British and Americans. J.G.Y.

HUMBOLDT, ALEXANDER, Baron von (1769-1859), the brilliant founder of the modern science of physical geography, which he described very completely in the picturesque book called *Cosmos,* written in 1845. Although born in Berlin, he grew up in the quaint old Castle of Tegel near Potsdam, studying with his elder brother Wilhelm under private tutors, until he entered the University of Frankfort-on-the-Oder. From childhood he always was interested in natural history, especially rock formations and flowers, so his studies were mainly along that line. While in Berlin he met George Forster, the famous naturalist who had accompanied Captain Cook on his expedition round the world. The two became great friends, for Forster's love of freedom and travel fascinated young Humboldt, and the latter determined to go on a trip of exploration. In 1790, after a short trip through Holland and England, he published his first work, entitled *Observations on the Basalt of the Rhine.* Two years later, following study in the mining school at Frieburg, he entered the official employment of the Prussian government as superintendent of mines in the newly acquired Franconian district. While in this position he published a botanical work, besides contributing to magazines.

His passion for travel was strengthened by his studies, so in 1797 he resigned his position, and after being disappointed in an exploring trip which had been planned and then abandoned by the French government, he resolved on his own account to visit the interior of South America. With his friend Bonpland he fitted up the small vessel *Pizarro,* on which the two men left to explore unknown regions. For five years the travelers were constantly exploring the great rivers, plains and mountains of the southern continent.

In 1804 he returned with his party to Paris, where he spent twenty years writing up his observations and scientific investigations, which are included in seven large volumes. In 1827

the king of Prussia asked him to live in Berlin, so from that time his home was in that city; a portion of the time he resided at the court. The year he moved to Berlin he delivered a remarkable series of lectures which formed the basis for his *Cosmos,* wherein he described nearly all that is now known of the physical universe. His entire life was spent making experiments which have added a vast fund of knowledge to the scientific world.

Consult Stoddard's *Life, Travels and Books of Alexander Humboldt.*

HUMBOLDT RIVER, the longest river of Nevada, rises in Elko County, in the northeastern part of the state and flows southwesterly for about 350 miles into Humboldt Lake, in Churchill County. Its course is through a barren region whose soil is chiefly alkaline, and its waters are so saturated with alkali that they are salty. The Humboldt is only a few yards wide, and towards its mouth it grows even smaller through evaporation. Along the sides of its valley are rugged mountain peaks. This valley, which is traversed by the Southern Pacific Railroad, is the only pass extending east and west through the mountains of Nevada.

HUME, DAVID (1711-1776), author of the more important principles of modern political economy, and a historian of note. Hume also influenced, to a great degree, the philosophic thought of the eighteenth century. He was born in Edinburgh, the younger son of the laird of Ninewells in Berwickshire. His first work, published partly in 1739 and partly in 1740, was the *Treatise upon Human Nature,* which was a valuable contribution to the science of psychology. Hume taught that one could not have ideas or thoughts except such as were derived from impressions gained through the several senses, either directly or by means of memory images.

In 1741 appeared *Essays, Moral, Political and Literary,* his next work. Before Hume's advent as an historian Great Britain did not recognize history as a branch of polite literature. Hume believed that history should not be a mere compilation of dates and facts or a record of war and intrigue. He included in his histories the literature, the conditions of life and the manners of the people. He was the first Scotchman to devote his entire time, and with marked success, to literature.

HUMIDITY, *hu mid' i ti.* As the moisture from the seas, rivers and lakes evaporates it fills the air with water vapor, a condition of the atmosphere which is described by the term *humidity.* When the air contains a great deal of vapor and feels damp, the humidity is said to be high, but if very little moisture is present the humidity is low. Usually the air is not completely filled with water vapor, unless it is raining, but the amount varies greatly with the temperature and location. The higher the temperature of the air, the greater the amount of vapor it may contain. When as much moisture is present as the atmosphere can hold at a certain temperature, the air is said to be saturated, or at the *dew-point.* The lower air over the ocean is usually almost saturated, while far inland in desert regions the air is so very dry that a person is not seriously affected by either extreme heat or cold.

The ratio of the amount of water vapor in the air to the amount required for saturation at that temperature is called the *relative humidity.* Thus, if the air contains one-half the amount of vapor which it can hold the relative humidity is fifty per cent. Wherever the land is agriculturally productive without irrigation, the relative humidity is about sixty-five per cent. A person feels "sticky" and uncomfortable when the humidity is too high, for the perspiration of the skin does not evaporate easily; but on the other hand too little humidity is injurious to the health. For this reason some means should be adopted for getting vapor into the atmosphere in a heated living room. Basins of water may be kept on registers, a jet of steam may be allowed to escape from a radiator, or a water pan may be kept in a furnace. The amount of moisture in the air is determined in various ways, but generally a form of hygrometer, consisting of two thermometers, is used. W.A.E.

Related Subjects. The reader is referred to the following articles in these volumes:

Cloud	Fog
Evaporation	Rain

HUM'MING BIRD, a family of birds found only on the American continents, and of special interest because of their small size, brilliant plumage and their rapid, darting flight. These tiny birds have been named with reference to the whirring sound made by their wings. Of more than four hundred species which have been recognized, only eighteen are known in the United States; of this group, all but one species belong to the Southwestern and Pacific coast states. The smallest of the humming birds, when stripped of their feathers, are no larger than a bumblebee, and only a few are

six inches long. The largest is a native of South American Andes, which grows to be and one-half inches in length. The long, er bills of these birds are especially ted for sucking the sweet nectar of such rs as the honeysuckle, the clematis, and the cupped trumpet-flower. The tongue, too, ıg, and is forked at the tip, constituting a efficient implement for procuring food.

HUMMING BIRDS

ey is not their only fare, for insects within ecesses of flowers are seized by them, and times they invade the web of the spider match away its prey.

by-throated Humming Bird. This, the lest and daintiest of the birds of the ed States, is the only one of the humming family found east of the Mississippi River north of Florida. In winter it seeks the ı regions from Florida to Central America, etween May and October it may be found Northern Canada to the Gulf of Mexico. than four inches long, and clothed in a ant coat of bright, metallic green, it well ves the characterization of James Whit- ı Riley, in his *South Wind and the Sun:*

> And the humming bird that hung
> Like a jewel up among
> The tilted honeysuckle horns.

is beautiful creature seems indeed to be a ged jewel" as it hangs poised in midair e a deep-throated flower, and the next nt flashes out of sight, scarcely giving the ver time to note the brilliant throat and it, which is metallic-red in one light, ge-flame in another, and in still another a y orange. Its tiny cradle, made of shreds ark, soft grass and bits of plant-down or cat-tail fluff, is no less exquisite than itself. The mother bird prefers a situation high up in the branches, and very often she covers the outside of the nest with lichens or bits of bark that blend so harmoniously with the background one hardly knows the little home is there. During the nesting season the male bird assumes an air of boldness, and he will fight intruders with remarkable agility and fearlessness. R.D.M.

HUMPERDINCK, *hoom'per dingk,* ENGELBERT (1854-), a German composer best known for his children's operas, or musical fairy plays, *Hänsel und Gretel, The Snow Maiden* and *The Royal Children.* He was born at Bonn, was an especial friend and protégé of Wagner, and it was he who prepared and coached the first cast of Wagner's *Parsifal* at Bayreuth, in 1882. Humperdinck wrote many songs, some chamber music and a few choral works. His *Moorish Rhapsody* for the orchestra embodies his impressions of Southern Spain. He also has written incidental music to several of Shakespeare's plays, including *The Merchant of Venice, A Winter's Tale, The Tempest* and *As You Like It.* However, he is most successful in his rendering of delicate folklore and fairy themes.

HUNDRED YEARS' WAR, a protracted struggle between England and France, which began in 1337 and ended in 1453. It lasted during the reigns of five English kings, from Edward III to Henry VI, and of five French kings, from Philip VI to Charles VII. One of its chief causes was Edward III's claim to the French throne because his mother was a sister of Charles IV of France. The Battle of Crécy, fought in 1346, at which firearms were first used, was the first important engagement, although the war began nine years earlier. The English gained a complete victory at Crécy, and ten years later were victorious at Poitiers. They lost ground, however, in spite of these victories, and were driven from the country. The English had practically no holdings in France when Charles VI ascended the throne. War broke out again in 1415, and France, weakened by internal dissensions, could not successfully repel its enemy, and in 1420 Henry V compelled Charles VI, by the Treaty of Troyes, to acknowledge him as his heir. In 1429, spurred on by Joan of Arc, France gradually forced the English to surrender their gains, and at the end of the war Calais was the only French territory held by the English. This was not regained for a century. W.E.L.

Related Subjects. For further information on this subject, the reader is referred to the following articles:

Agincourt	France, subtitle *History*
Charles (France)	Henry (England)
Crécy	Joan of Arc
Edward, the Black Prince	Poitiers

HUNGARY, *hung' ga ri,* a kingdom of Europe, one of the two states which make up the strangely-united Austro-Hungarian monarchy. In addition to Hungary proper, it includes Transylvania and Croatia and Slavonia, the

LOCATION MAP

whole forming a compact area which lies within the crescent-shaped curve of Austria somewhat in the manner of the familiar phenomenon known as "the old moon in the new moon's arms." Its total area of 125,039 square miles is more than half that of Austria-Hungary as a whole, but its population of 20,886,487 is only about forty per cent of the combined population. Since there are but two cities of over 100,000 inhabitants, however, it may be seen that the country as a whole is not sparsely settled.

Under the proper subheadings of the article AUSTRIA-HUNGARY is to be found a discussion of the surface and drainage, resources and population of Hungary, together with a statement concerning the matters on which Austria and Hungary legislate jointly.

Government. But aside from the three subjects—foreign questions, military affairs and national finance—which are treated jointly by the governments of the two monarchies, Hungary has, as has Austria, a government of its own. The Austrian emperor is king of Hungary, but with that the connection ceases; Hungary manages all its internal affairs by itself. The sovereign does not play so important a part as in the sister state, Austria. A member of the executive Cabinet must sign every royal decree, and these Cabinet ministers are responsible to a Parliament of two houses. The upper house, known as the *Table of Magnates,* is made up, like most upper houses of European legislatures, of the nobility and Church dignitaries, while the members of the House of Representatives are elected by direct vote, the franchise being limited by a small income restriction. The Magyars (which see) are decidedly the dominant element in both houses, and their language is the official tongue.

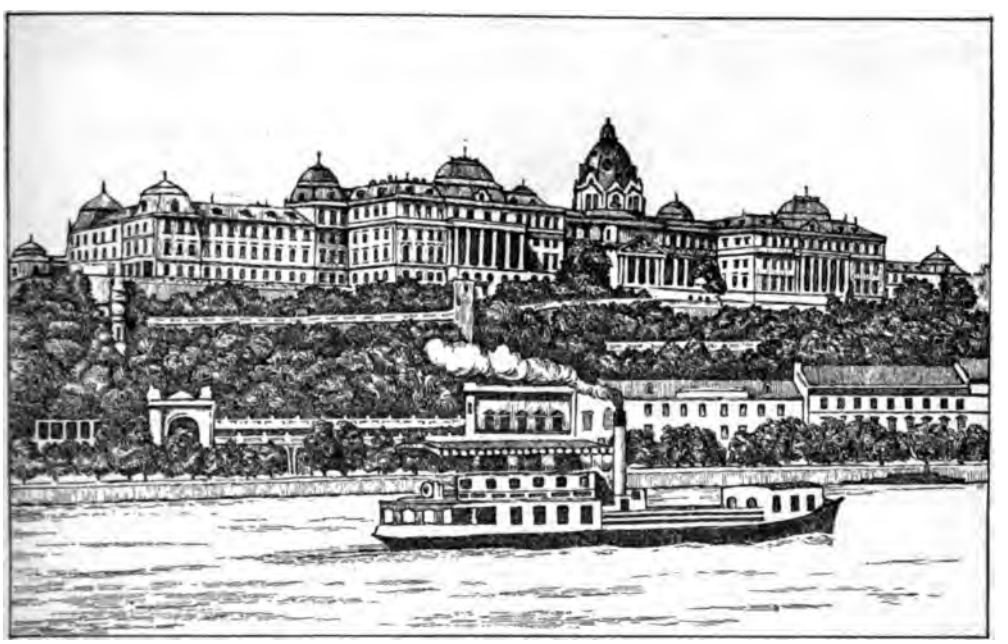
For governmental purposes, Transylvania is a part of Hungary proper, and has no legislative body, but Croatia and Slavonia have a diet (legislature) of one house which legislates on local matters. This crownland also sends representatives to the Hungarian Parliament.

History. The history of Hungary has been a most romantic one, for through century after century its people, brave, high-spirited and independent, have had to fight not only to keep from submitting to the domination of some Germanic power, but also to hold back the hordes of Turks who long threatened to engulf them from the south. Indeed, Europe owes much to the Hungarians for having served as a buffer against the Turks.

The Hungarians, whose name for themselves is *Magyars,* are not to be confused with the Huns who helped to bring about the destruction of the Roman Empire. Entering the present territory of Hungary in 906, these relatives of the Finns drove the Slavic tribes from the basin of the middle Danube and made numerous settlements. They pushed up the Danube till they came in contact with the Germans, who occupied the upper course of the river from about Pressburg west, but before the end of the tenth century they were permanently driven back from the German lands by Otto the Great. With their acceptance of Christianity in 1000 by Stephen, the first crowned king of the nation, a new life began for the Hungarians. Civilization advanced marvelously, the kingdom was strengthened and new territory acquired, until Hungary became a state to be reckoned with.

With Sigismund (which see) as king of Hungary from 1387 to 1437, and for the last twenty-five years of the time Holy Roman Emperor as well, Hungary was brought into close touch with the Empire, and under Albert V, son-in-law of Sigismund, came for a time under the direct sway of the Hapsburgs, the ruling house

of Austria. Hunyady, the great national hero of Hungary, though sometimes suffering defeat, held back the Turks from the Danube countries, and his son Matthias became in 1458 king of Hungary. Under this great monarch Hungary reached the height of its glory, for no reigning monarch of the time could rival Matthias in military genius, love of learning and statesmanlike ability. But with his death in 1490 there began a period of factional strife and anarchy, of which the watchful Turks were swift to take advantage. On August 29, 1526, occurred the great battle of Mohacs Field, in



THE ROYAL PALACE AT BUDAPEST

which the Hungarians were completely defeated, the king and 20,000 of his soldiers falling in the fight. To this day Mohacs stands to the Hungarians as the symbol of awful disaster, and they have a reckless song with the oft-repeated refrain

"But no matter! More was lost at Mohacs Field."

As a result, nearly all of the kingdom of Hungary was conquered, Buda, the capital, with its surrounding territory, falling to the Turks, while the Hapsburgs held the western territories. Religious differences were rife, for Hungary had many Protestants and the Hapsburgs were strongly Catholic; and for a time the emperors were compelled to grant religious liberty. The withdrawal of these privileges and of self-government which had accompanied them led to a rising in which the Hungarians called their century-long enemies, the Turks, to their aid, and in 1683 Vienna was all but forced to surrender to the Moslems. John Sobieski saved it, however, and three years later Buda was also wrested from the Turks. As a punishment, the Hungarians were made to agree that the crown of their country should for all time be heredity in the Hapsburg line.

In the early eighteenth century, risings in behalf of liberty were frequent among the Hungarians, but Maria Theresa, empress of Austria, aroused their feelings of loyalty and they aided her in her struggle against Frederick the Great (see MARIA THERESA). During the later eighteenth and early nineteenth century, however, discontent was constantly growing, and in the years following 1815 Hungary became conspicuous for the brilliance of its statesmen and authors who worked for reforms and a constitutional government. By 1848 a large measure of liberty was gained, but the patriots could now be satisfied only with actual independence, and in 1849 a revolt broke out under the leadership of Kossuth (which see). The result was defeat for Hungary, with entire loss of the reforms gained in the previous quarter-century; and not until 1866, when Austria suffered so sharply at the hands of Prussia, did the Hun-

Sunday Costumes in Hungary

garians regain their constitutional liberty. Under Francis Deák Hungary made certain demands, and these were acceded to in the *Ausgleich* of 1867, the instrument which established the present dual monarchy of Austria-Hungary. Francis Joseph was crowned at Buda on June 8, 1867, as king of Hungary, and succeeded in making himself very popular with his Magyar subjects. Indeed, those wise in political affairs feel that it has been the personal popularity of the monarch which has held Hungary for almost half a century to its allegiance, for the Hungarians are a people with an intense feeling of nationality, and they are in many respects more progressive than the inhabitants of the Austrian Empire. Thus a break between the two sections of the Austro-Hungarian monarchy

In Hungary little boys and girls dress alike. This boy is saluting by kissing his little lady's hand — a national custom.

Young Men in Sunday Costume

would be no great surprise, especially since the death of the popular Francis Joseph. W.E.L.

Consult Stokes' *Hungary;* Bovill's *Hungary and the Hungarians.*

For the history of the dual monarchy itself, since 1867, see AUSTRIA-HUNGARY, subhead *History;* see, also, AUSTRIA. The outline questions and index of related topics are also given under AUSTRIA-HUNGARY.

HUNS, *hunz,* a wandering and warlike tribe of the Mongolian race, who made hostile invasions into the Roman Empire. Under Attila, their greatest leader, they almost destroyed the empires of the East and West. They crossed the Volga about A. D. 350, totally defeated and afterwards united with the Alani, another barbarous tribe, and then attacked and conquered the Goths. With various subject tribes the Huns then invaded Gaul under the leadership of Attila, and were finally defeated in about 451. Their fate is uncertain, but it is supposed that they were merged in later invading barbarian tribes. See GOTHS; GAUL; ATTILA.

HUNT, HELEN FISKE. See JACKSON, HELEN FISKE HUNT.

HUNT, [JAMES HENRY] LEIGH (1784-1859), an English journalist and poet, some of whose best work was produced under circumstances that would have defeated the average man. After spending eight years at Christ's Hospital, Hunt went to London, where he remained for two years, writing verses and wandering about the city under the tutelage of a minister, who had a collection of the boy's poems published in 1801. In 1808 Hunt and his brother began to publish the *Examiner,* a newspaper, and in 1812, when the paper attacked the Prince Regent through its editorial columns in an article entitled *The Prince on St. Patrick's Day,* the editors were tried and condemned to two years' imprisonment and to pay a fine of £1,000 ($5,000). The poet was sent to Horsemonger Lane jail, and he directed the *Examiner* from there with unabated energy. Some of his best sonnets were published during his imprisonment, from 1813 to 1815.

His collection of poems, *Foliage,* was published three years after he was released, and in 1819 he began a weekly newspaper called the *Indicator,* in which some of his best essays appeared. In 1822 he went to Italy and conducted a newspaper called the *Liberal,* which was not successful. Hunt's *Autobiography* is a complete and individual expression of the man. His works as poet and critic are a notable contribution to nineteenth century literature. Among his books are *Men, Women and Books; Jar of Honey from Mount Hybla; Imagination and Fancy, Wit and Humor; The Town; The Story of Rimini; Palfrey, a Love Story of Old Times; Legend of Florence,* a play; and *Book of the Sonnet,* which was published after his death.

HUNT, MARY HANCHETT (1831-1906), an American temperance educator and teacher, to whose efforts is mainly due the teaching in the schools of the effects of alcoholic drink upon the human system. She was born at South Canaan, Conn., was educated at the Palapsco Institute in Maryland, and for a number of years was an instructor in chemistry in that institution. While there she became interested in investigating the nature and effects of liquors. She identified herself with the Women's Christian Temperance Union and became the leader of the movement that made temperance physiology, or scientific temperance, a compulsory part of school instruction, planning from her office in Boston a remarkable campaign that lasted over thirty years. Temperance laws were adopted largely through her efforts in the United States; Canada, Chile and other countries also adopted similar laws. She was the author of thirty textbooks on temperance physiology, and also the founder and editor of *School Physiology,* a monthly journal for teachers in public schools.

HUNT, RICHARD MORRIS (1828-1895), an American architect who exercised an artistic influence on his profession. He was born at Brattleboro, Vt., and was a brother of William Morris Hunt, the painter. When only fifteen years of age he went to Geneva, Switzerland, to study architecture, afterward studying in Paris. He traveled through Europe, Egypt and Asia, and then was employed for a time on the new Louvre in Paris, under his old master, Lefeul. In 1855 he returned to America and worked with Thomas Ustic Walter on the Capitol extension in Washington. He established a studio for architects in New York, and this was the pioneer of all architectural training schools in America.

Among the noted buildings he designed are the Lenox Library and the *Tribune* Building in New York, the Divinity Building at Yale, the Fogg Museum at Harvard and the World's Fair Administration Building in Chicago. He also planned the Yorktown Monument and the pedestal of the Statue of Liberty in New York harbor. Some of the most palatial private houses in the United States were built by him,

among which are the "Breakers" at Newport, the country home of George Vanderbilt at Biltmore, S. C., and the mansion of W. K. Vanderbilt in New York. In 1888 he became president of the Institute of Architects, and was honored by the receipt of decorations from foreign learned societies. A beautiful memorial was erected in his honor in New York in 1898 by the associated architectural societies.

HUNT, WILLIAM MORRIS (1824-1879), an American painter of note who as a teacher of painting threw all the strength of a remarkable personality into his work. He was dedicated to the advancement of American art, and it is in this direction that his widest usefulness lay. He was born at Brattleboro, Vt., and educated at Harvard College; after graduation he settled in Boston. While in Europe for study he became a pupil and friend of Millet, the French painter. Although Hunt executed several portraits of famous Americans, numerous figure subjects and many fine mural decorations (notably at the capitol at Albany, N. Y.), he was at his best in his landscapes. His most noted work, *Gloucester Harbor,* is a brilliant bit of sky and water, but his *Falls of Niagara* is full of grandeur. Two of his figure subjects, *The Hurdy-Gurdy Boy* and *Girl with the Kitten* hang in the Boston Museum. In all his paintings Hunt showed a remarkable technique and fine feeling for color.

HUNTER, GORDON (1863-), a Canadian barrister and jurist, chief justice of British Columbia since 1902. He was born at Beamsville, Ont., attended Brantford Collegiate Institute, and was graduated from the University of Toronto in 1885. After reading law in a Toronto office for three years, he was called to the bar. In 1891 he removed to British Columbia, where he became the first official law reporter to the provincial supreme court. Later he became crown solicitor and in 1902 chief justice of the supreme court. In 1903 he acted as chairman of a royal commission to investigate strikes and lockouts in the mines of British Columbia.

HUNTINGTON, IND., is the county seat of Huntington County, in the northeastern part of the state, twenty-four miles southwest of Fort Wayne and 104 miles northeast of Indianapolis. It is on the Little River, one mile from its entrance into the Wabash, and is on the Erie, the Wabash and the Cincinnati, Bluffton & Chicago railroads. Instead of a local trolley the city has transit automobiles, but is connected with other towns by interurban lines. In 1910 the population was 10,272; in 1916 it was 10,880, by Federal estimate. The area is nearly three square miles.

Huntington has a United Brethren College, a Federal building, completed in 1917 at a cost of $120,000, a county courthouse which cost $325,000, a city hall, a Carnegie Library, in which is a splendid collection of Indian relics, and a county hospital. The important industries include a cedar chest factory, the annual product of which is worth $350,000; a clam-shell bucket factory with an annual output valued at $500,000, and manufactures of railroad cranes, pianos, shoes, rubber goods, coal chutes, milk-bottle caps, etc. Coal and lime deposits are found in the vicinity, and there is a large trade in these and in agricultural products. Huntington was settled in 1834, incorporated as a town in 1848, and became a city in 1873. C.B.W.

HUNTINGTON, W. VA., an important shipping point and industrial center, with a population of 31,160 in 1910, which had increased to 45,629 in 1916. It is the county seat of Cabell County, and is situated in the westernmost section of the state, on the Ohio River just below the point where it receives the waters of the Guyandotte River. Charleston, the state capital, is fifty miles east by rail, and Cincinnati, Ohio, is 160 miles northwest by water. The Chesapeake & Ohio Railroad, constructed to the city in 1871, and the Baltimore & Ohio, built in 1892, provide railway accommodations. Electric lines connect with adjacent cities east and west, and there is steamer communication with all important river ports. The city was settled and founded in 1870 and named for Collis P. Huntington, capitalist and railroad-builder, who selected the site. In 1909 the commission form of government, with four commissioners, was adopted. The area is a little more than twelve square miles.

Huntington is a city of rapid growth. Within its limits are several parks, Ritter Park (twenty acres) being the largest. The most notable buildings are a $75,000 Federal building, constructed in 1906, and a $65,000 Carnegie Library, erected in 1905. Besides its public school system it has Marshall College (a state normal school), business colleges and Douglas High School for colored students. The West Virginia Asylum for incurables is located here. Huntington has foundries, machine shops, lumber and planing mills, bottling works, meat-packing establishments and manufactories of paints, glass, stoves and bricks. It is an im-

portant shipping point for coal, iron, salt and lumber. T.W.H.

HUNTSVILLE, a popular summer resort in Muskoka County, Ontario, on the Grank Trunk Railway, 146 miles north of Toronto and sixty miles north of Orillia. Though best known as one of the Muskoka Lakes resorts, Huntsville is also important for its lumber mills and tannery. Population in 1911, 2,358; in 1916, about 2,750.

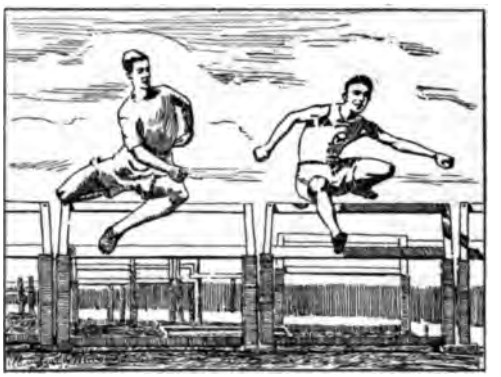
HUNTSVILLE, ALA., an important cotton-manufacturing city and the county seat of Madison County, situated in the north-central part of the state, about eighteen miles south of the Tennessee line. It is ninety-six miles directly northeast of Birmingham and ninety-seven miles southwest of Chattanooga, and is on the Southern and the Nashville, Chattanooga & Saint Louis railways. The city was reduced in area in 1909, causing a reduced figure, 7,611, for the census of 1910. Surrounding the city are a number of populous suburbs, and within a radius of four miles from the county courthouse there was a population in 1910 of over 27,000.

Huntsville is in the Tennessee Valley, about ten miles north of the Tennessee River, and is surrounded by a large and fertile agricultural, cotton, fruit and live-stock raising country. In the large cotton mills of the city there are 203,000 spindles and 4,374 looms, having an annual product in sheet cloth, knitted goods, khaki cloth, drilling and printing cloth valued at $8,500,000. The land owned by the mills is over 1,200 acres in extent, and their floor space is thirty-four acres. In addition to the cotton mills there are foundries and machine shops, cotton seed and fertilizer plants, oil mills, hoop and heading factories, fiber and planing mills and brick plants. Huntsville is in one of the most extensive nursery sections of the United States.

In the city is a state normal and industrial school, and four miles north is located the Alabama Agricultural and Mechanical College for Negroes. The more prominent buildings include a Carnegie Library, Elks' Home, Federal building, Y. M. C. A., banks and hotels. Among near-by places of interest is a summer health resort on Monte Sano, a hill 1,700 feet in altitude.

Huntsville was settled in 1805 by John Hunt, trapper and backwoods pioneer. In 1809 the town was incorporated as Twickenham and in 1811 as Huntsville, and was the first Alabama settlement to receive a charter. It was chartered as a city in 1844, and since then has adopted the commission form of government. The city owns its waterworks. P.O.A.

HUR'DLING, a foot race which combines running and jumping. In American track meets two hurdle races are usually held, the *120-yard high hurdles* and the *220-yard low hurdles;* in Olympic games (which see) the



HURDLING

distance is made 440 yards. The object of a hurdler is to clear the obstructions with the least possible interference to his stride and the least necessary rising from the ground. His feet and legs almost graze each bar, sometimes overturning a hurdle, though if a runner upsets a stated number of hurdles (usually either three or four) he is disqualified. In England the race is run on the grass, and the hurdles are fixed so that they cannot be knocked down. The high hurdles are ten in number and set ten yards apart; the first is fifteen yards from the start and the last an equal distance from the finish. Their height is three feet six inches. The low hurdles are equal in number, but are placed twice as far from each other; they are only two feet six inches high. W.C.

HUR'DY-GUR'DY. See HAND ORGAN.

HU'RON, or **WYANDOTTE,** *wi'an dot,* a powerful confederation of Indian tribes who lived in Canada, between Lake Simcoe and Georgian Bay east of Lake Huron. The name is French, and means *bristly,* or *rough haired.* When the Hurons were first known to the French, about 1615, they were a well-organized people numbering about 10,000. The chiefs were elected in an unique manner, by the vote of all the mothers of the tribe. Their councils were divided into legislative and judicial bodies, and their military affairs were entirely separate from both of these. The blood feud was sacred among them, and revenge for

injury or insult was a first duty. They were bound to respect the property, dignity and liberty of each other, but not necessarily those of another tribe. Although they had a well-defined religion of their own, which embraced the worship of all material objects, they received kindly the Jesuit priests who established missions among them.

After many years of bitter warfare with the Iroquois the Hurons were forced to leave their Canadian home. They fled southward, finally reaching the Mississippi River, from which they were driven back by the Sioux. In 1751 they settled on the site of the present city of Sandusky, Ohio, and were there known by the name of Wyandotte. About 300 now reside on a reservation in Oklahoma; a few hundred live in Ontario and Quebec.

HURON, LAKE, one of the five Great Lakes of North America, between Michigan and Ontario, and forming a part of the boundary between the United States and Canada. Its length from north to south is about 250 miles; its average width is about 155 miles, and its

LOCATION MAP

The relative position of Lake Huron in the Great Lakes chain is shown in black in the small corner map.

area, including Georgian Bay, the principal arm, and North Channel, is 23,800 square miles. It is therefore nearly as large as the state of West Virginia, and almost one-half the size of Pennsylvania. Huron's elevation above sea level is 581 feet, the same as that of Lake Michigan; it is twenty-one feet below the level of Lake Superior, eight feet above that of Lake Erie and 334 feet above that of Lake Ontario (see chart, in article GREAT LAKES). The maximum depth of its waters is 802 feet, and the area of its basin including its surface is about 74,000 square miles. It receives the waters of Lake Superior through the Saint Mary's River, and the waters of Lake Michigan through the Strait of Mackinac. Through Saint Clair River, Lake Saint Clair and the Detroit River it discharges into Lake Erie.

The construction of the Sault Sainte Marie Canal (which see) has greatly increased the commercial importance of Lake Huron. The shore line is generally low, but along the southeastern coast picturesque cliffs rise to a height of 150 feet. The waters are remarkably clear and contain an abundance of fish, of which the most important is whitefish. Of the small islands which dot its surface in the north, Mackinac Island in the United States and Grand Manitoulin in Canada are the most important. Owing to violent storms, the lake is dangerous for navigation from December until May. Cheboygan, Bay City, Mackinac, Alpena, Saint Ignace, Owen Sound and Collingwood are among the principal cities and ports along the coast.

HURRICANE, *hur'i kane,* a violent and destructive windstorm of the tropics. Nearly seventy per cent of these storms occur in the West Indies and the China Sea, during the months of August, September and October. Those in the China Sea are known as *typhoons* (see TYPHOON). The typical hurricanes begin in the warm Atlantic belt north of the equator and sweep across the West Indies to the coast of the United States; some turn to the northeast, and are dissipated in the Atlantic while moving towards Europe, but many pass into the Mississippi Valley by way of the Gulf of Mexico. In the beginning the diameter of the storm area is from 100 to 300 miles, but it may increase to a thousand miles or more.

The approach of a hurricane is heralded by an ominous stillness in the atmosphere. Then follow light breezes which increase to high winds, and when the storm breaks in all its fury the wind blows at the rate of eighty-five or even a hundred miles an hour, while rain falls in torrents. The wind whirls in a spiral around a center of low pressure, and in that center no wind is perceived, as the current is upward; this area of low pressure is sometimes called the *eye of the storm.* The intensity of the gale is greatest near the place of its origin, and it diminishes as the diameter of the circle covered increases. Any very severe wind is often miscalled a hurricane.

The fury of a tropical hurricane is almost indescribable; in its path ships are torn from their anchors, substantial buildings are blown to pieces, fruit and sugar plantations are destroyed and great trees are uprooted; and the waves whipped up on the sea by hurricane winds are the largest known to mariners. A destructive storm of September, 1889, while on its way from the West Indies to the Carolina coast, produced a high surf on the New Jersey beaches, though the storm area was a thousand miles distant. Hurricanes are closely related to the destructive tornadoes that occur in the Mississippi Valley, but the tornado has a smaller diameter and is more violent than the hurricane. Both are classed as cyclonic storms. See CYCLONE; TORNADO.

Consult Ferrell's *Popular Treatise on the Winds.*

HUSBAND AND WIFE, the term, both in a legal and a popular usage, for a man and a woman who are married to each other.

Common Law Status. Under the old English common law, which forms the basis of most laws to-day in England, Canada and the United States, the husband and wife were accounted one person, and that one person was the husband. When a woman married, she became a part—and a minor part, at that—of her husband; she was *civiliter mortua,* which means *dead as a citizen.* Her property, unless it was most carefully and rigidly secured for her before marriage, became absolutely her husband's, and he might dispose of it or will it away as he chose. Her clothes were not her own, nor were her earnings or her children. She could make no contracts; she could not sue or be sued. For centuries she could not even have redress for wrongs or actual brutality at her husband's hands, since legally she was a part of him, and so she was entirely at his mercy. Any crime committed by a woman was charged to her husband; it was taken for granted that she had acted under coercion and by his orders. Her husband was legally responsible for any scandal or libel uttered by his wife. This unfairness and inequality continued through many centuries.

The only circumstances under which a married woman was treated as a responsible person were in case she was married to an alien or a convict, or in the event that her husband had been banished. In that case her property remained her own, she might enter into contracts, sue or be sued as a *feme sole,* the old legal phrase for a *single woman.*

Present Status of Husband and Wife. It is the tendency to-day to modify the laws which discriminate so unfairly against women, to work toward a real equality. But the progress in the direction of better laws is slow, and it is uneven; some of the states and provinces are still in the Dark Ages as far as fair legislation for women is concerned, and even in the most progressive and enlightened communities too many of the absurdities of the old common law still linger.

Common Law Survivals. In connection with the facts recited below, it must be borne in mind that the laws on the subject are far from uniform. The statements apply to the majority of conditions. To-day the husband still determines the place of residence; but since the introduction of divorce he cannot force his wife to live in an unhealthful climate or under conditions which are too trying, for he lays himself open thereby to the charge of cruelty. But under most laws the husband can lock his wife up to keep her from leaving him, forbid her to visit her family, compel her to go to a specified church, restrain her from squandering money, keep her from bad company and punish her to a slight extent. Confined under such circumstances, the wife has no right of *habeas corpus* (which see). The wife has no corresponding rights over her husband's liberty. Wife-beating, however, which once flourished, is now a severe charge against a husband.

Support and Earnings. A husband is bound to support his wife in a ratio with his income and ability, unless his wife has forfeited her right by misconduct, has waived it voluntarily, or is able to support herself. The wife, however, has no right to her husband's services, although in most jurisdictions the husband has the absolute disposal of his wife's time, services and earnings. In Tennessee, notably, any wage-earning wife must notify her employer in writing that she and her children are dependent on herself for support, or her earnings are her husband's.

Property Rights. In most states the woman's property automatically becomes her husband's with the conclusion of the marriage ceremony. By prenuptial settlement the wife may have a separate estate; without such a settlement, the use, rents and profits from his wife's real estate and all her personal property go to the husband.

Husband's Liability. The husband is liable for debts which his wife contracted before

marriage. On the other hand, in California, Nevada and the Southern states the wife's property, her business or its profits may be attached by her husband's creditors.

In some states, if a wife commits a crime in her husband's presence he is responsible for it. He is also liable for slander which she speaks in his presence. If she commits a crime out of his sight it is held that she did it of her own accord, and is therefore responsible for it herself. The wife is never responsible for her husband's crimes. Under the old common law, where a man and wife were one, it was impossible to charge them with conspiracy, since conspiracy by one person was held a manifest absurdity.

The Wife's Dower Right. A husband can will his estate away from his wife, provided he leave her one-third. This one-third is called her *dower right,* and she can always sue successfully for it. The wife cannot will real estate or personal property unless it is her separate estate. In Tennessee, again, the wife can sue for her third of her deceased husband's property, but no matter what may be the reading of her will, the husband is entitled to all his deceased wife's estate. This dower right of the wife to one-third of her husband's realty holds good even during life, and it is necessary to get her consent and signature before he can dispose of such property in any way.

In most states anything bought with money belonging to both husband and wife belongs to the husband. Personal apparel, unless the husband announces in actual words before witnesses that he presents it to his wife, is the husband's property. In other states the husband owns literally half of each article of his wife's clothing.

Husband and Wife as Witnesses. An interesting survival of old common law spirit is that neither husband nor wife can be a witness against the other, except in cases where one is suing the other—usually for separation or divorce, but sometimes for civil injuries as well.

The Case of Joint Guardianship. The most unjust legislation against women is that which does not give her a joint interest with her husband in their children. In spite of its obvious unfairness, in many states the father seems to be the only legal parent a child has. Limited only by the laws on compulsory education, employment of young children, etc., a father can put his child to work when and where he chooses, and has the sole right to the earnings as long as that child is a minor. One hundred fifty years ago Blackstone said, "A mother, as such, is entitled to no power, but only to reverence and respect." Reverence and respect, however, without legal backing, are often not enough to help a mother to keep her minor child from being exploited by an unscrupulous father. Fortunately, in the century-and-a-half since Blackstone's time, this sentiment has been modified, and in many jurisdictions the mother has been endowed with a half-interest in her own child. A.C.

Consult Macqueen's *Rights and Liabilities of Husband and Wife,* from English standpoints; Schouler's *Domestic Relations,* giving a summary of statutes of the United States.

HUSS, JOHN (about 1373-1415), a Bohemian religious reformer and martyr, to whom it was given to transmit from John Wycliffe to Martin Luther the torch which kindled the fires of the Protestant Reformation (see WYCLIFFE, JOHN; REFORMATION). Huss became a lecturer in the University of Prague in 1398, where two years previously he had received the degree of M. A. In 1401 he was ordained a priest, becoming the popular preacher of the congregation of Bethlehem Chapel in Prague, and confessor to the Queen of Bohemia. By this time the teachings of the English reformer Wycliffe had made a profound impression upon him, and his translations of Wycliffe's writings and spirited defense of his opinions stirred up the opposition of the university authorities, who forbade him to discuss the new doctrines or to write about them.

Neither this prohibition nor the bull issued by Pope Alexander V in 1409 against Wycliffe's teachings, nor the decree of excommunication directed against him and his disciples the following year, served to turn Huss from the path which he believed was leading him to the light. Affairs moved rapidly to a crisis. In 1412 there appeared in Prague a messenger from the Pope bearing papal bulls by which a crusade was decreed against the excommunicated king of Naples, and promising religious advantages to those who would take part in it. Huss boldly attacked this policy, thereby widening the breach between him and the Church authorities, and in 1414 he was summoned to appear before the Council of Constance to answer charges of heresy. His journey thither was made under the protection of his friend Wenceslas, king of Bohemia, and his safety was guaranteed by the Emperor Sigismund.

arrival in Constance, however, Huss
ed and cast into prison. On June 5,
ase came to trial, and in the hear-
re the Council his doctrines were
d and he was ordered to recant. He
ermitted to defend his views in open
d his plea that his advocacy of Wyc-
hings was not a renunciation of Ro-
olic doctrines did not satisfy his
The Council therefore found him guilty
and he was delivered over to the
orities to be burned at the stake. The
as carried out on July 6, and on the
execution his ashes were thrown into
s of the Rhine. The martyrdom of
ed sorrow and indignation through-
mia, leading finally to the Hussite
HUSSITES. B.M.W.

Lützow's *Life and Times of Master*

R, *huz zahr'*, a light-horse cavalryman
, armed with carbine and saber. This
valry originated in Hungary in 1458,
were organized to fight against the
d the name was derived from the
ord *husz*, meaning *twenty*, the troops
ed by the taking of each twentieth
n the soldiers were counted. The
hussars were famed for their cour-
wore a semi-Oriental dress which set
of uniforms for the hussars of other
who now form a part of nearly all
armies. Nearly two-thirds of the
the British army consists of hussars
rs. A hussar's original uniform con-
a high cylindrical cloth cap, jacket
y braiding and a dolman or loose
ing from the left shoulder.

TES, *hus'ites*, the disciples of John
Bohemian religious reformer, whom
red as a martyr. Following his death
bout 450 Bohemian nobles organized
s into a semireligious body to avenge
of their leader and to show their
f the decrees of the Church. From
434, under the generalship of Ziska
opius, they waged a vigorous civil
repeatedly victorious over the forces
ist them by the Pope and Emperor
, and harassed and terrorized the
ountries bordering on Bohemia. Con-
churches were destroyed, and priests
s were slain.

he beginning of their organization the
were divided in doctrine into two
these were the *Calixtines*, or con-
servative party, who were more in sympathy with the Church; and the *Taborites*, who were radical in their rejection of religious doctrines and practices. A third party, called the *Orphans*, also developed. In 1431, the Council of Basel succeeded in coming to an agreement with the Calixtines, who then returned to the Church and acknowledged Sigismund as king. The Taborites and Orphans were completely routed in 1434, disappeared as a political power and finally became identified with the Bohemian Brethren. See HUSS, JOHN.

HUTCHINSON, ANNE (about 1590-1643), a religious reformer in colonial America, born in Lincolnshire, England. She married William Hutchinson, and emigrated to Boston in 1634, where she soon denounced the Massachusetts clergy, whose views she did not share. Mrs. Hutchinson held meetings and lectured, and for her peculiar theological beliefs was banished from the colony for heresy. With a number of friends she went to Rhode Island and started a settlement at Portsmouth, one of the principles of the new colony being that no one was "to be accounted a delinquent for doctrine." After the death of her husband, who shared her opinions, she removed to a new settlement in the colony of New York, where in 1643 she and her whole family were taken prisoners, and all, excepting one daughter, were killed by the Indians.

HUTCHINSON, THOMAS (1711-1780), the last royal governor of Massachusetts Bay colony, was the son of a merchant of Boston and was educated at Harvard. His political career began in 1737, when he was elected to the Massachusetts General Court. He took part in the Albany Convention in 1754 and was made chief justice of the colony in 1760. While occupying this office he issued the famous Writ of Assistance (which see). He opposed the Stamp Act, but considered it legal, and incurred the enmity of the colonists while he endeavored to enforce it. During this period his house was attacked by a mob and manuscripts and books were destroyed. In 1769 he became acting governor, when Governor Barnard was sent to Virginia, and in 1771 received his commission as governor. Throughout his administration he had friction with the colonists, and in 1774, when General Gage was appointed military governor, he went to England to reside. His *Diary and Letters* was published in 1884, and in 1886 his *History of Massachusetts Bay*, one of the best original sources bearing on the history of the colonial period.

HUTCHINSON, KAN., the county seat of Reno County, noted for its salt industry. It is situated southeast of the geographical center of the state and on the Arkansas River. Wichita is forty-five miles directly southeast and Kansas City, Mo., is 219 miles east by rail. Three trunk lines serve the city—the Atchison, Topeka & Santa Fe, the Chicago, Rock Island & Pacific and the Missouri Pacific. The city was founded in 1871, was incorporated in 1873 and since 1909 has been governed on the commission plan. The population in 1910 was 16,364; a Federal estimate in 1916 showed an increase to 20,753. An area of nine and one-half square miles defines the city's limits.

Hutchinson is the wholesale and jobbing center for a large district, but since 1887, when deposits of rock salt were discovered, its interests have been largely centered in this industry. The grain and meat-packing industries are important, and the manufacture of flour, soda ash and strawboard is considerable. The place is the home of the Kansas State Fair, and is a noted convention city in its territory. Convention Hall, the State Industrial Reformatory, the public library and the courthouse are the principal buildings. Besides the fair grounds, which cover one square mile, the city has Glendale and Northside parks.

HUXLEY, *hux'li,* THOMAS HENRY (1825-1895), a famous English naturalist and a leader among men of science. After graduating from the University of London in 1845 he entered the medical service of the navy. He spent four years on *H. M. S. Rattlesnake* on a surveying expedition in Australasia, where he had opportunity to study the anatomy and physiology of the transparent oceanic forms—jellyfish, pelagic mollusks and worms. He sent a great many valuable scientific papers to the Royal Societies while on the cruise, and when the *Rattlesnake* returned in 1850 Huxley found that his papers had made him famous. In 1853 he retired from the navy.

In 1854 he accepted the post of lecturer on natural history at the Royal School of Mines. Soon after his return from the voyage of the *Rattlesnake* he had made the acquaintance of Charles Darwin, and also of the botanist Hooker. He met Tyndall in a railway carriage on his way to a meeting of the British Association at Ipswich in 1851, and they became warm friends. Huxley, Tyndall and Hooker eventually became a triumvirate which governed and determined the official side of scientific affairs in London, influencing and directing public opinion.

At the age of twenty-five Huxley had established a reputation as a comparative anatomist, palaeontologist, microscopist and an exponent of original views of zoölogy. When Darwin's *Origin of Species* was published, Huxley exhibited a new activity in defending and expounding the views of his friend. In 1883 he was elected president of the Royal Society. Two years later he retired from active life on account of ill health, but between that year and his death in 1895 he published a great many brilliant essays. Among his works are: *On the Theory of the Vertebrate Skull, The Oceanic Hydrozoa, Man's Place in Nature, On Our Knowledge of the Causes of the Phenomena of Organic Nature, Elementary Physiology, Elements of Comparative Anatomy, Introduction to the Classification of Animals, Critiques and Addresses, American Addresses, Physiography* and *Anatomy of Invertebrate Animals.*

Consult Clodd's *Thomas Henry Huxley;* Osborn's *Huxley and Education.*

HYACINTH, *hi'a sinth,* a favorite spring flower of the lily family, whose blue, white or purple blossoms make a beautiful display in the garden during the months of March and April. The hyacinth grows from bulbs and belongs to a group comprising about thirty species, natives of Africa, Asia Minor, Syria and Persia. Introduced into Europe about the beginning of the sixteenth century, the flower speedily became popular with the English and the Dutch, and its cultivation assumed mammoth proportions in Holland. The soil and climate of that country are especially favorable to the production of bulbous-rooted flowers, and hundreds of acres are given over to the growth of hyacinths near Haarlem, bringing in a yearly revenue of many thousands of dollars. The flowers are drooping and bell-shaped, and both single- and double-flowered varieties are cultivated. In Shelley's poem, *The Sensitive Plant,* are these lines:

> And the hyacinth purple and white and blue,
> Which flung from its bells a sweet peal anew
> Of music so delicate, soft, and intense,
> It was felt like an odor within the sense.

The flowers are grown in open beds, in hothouses and in the home. Rich, well-drained soil is required by them when cultivated in the open. The bulbs are planted from September to November, about five inches deep, and in beds spaded to a depth of twenty inches.

root attains its principal growth in the and during the winter months the beds covered with leaves or rotted manure. y in the spring, when the flowers appear, stems are tied to slender stakes to protect ı from accident. In the summer, after the es have withered, the bulbs are taken up stored in dry soil or sand. Florists, by

hyacinth for constancy wi' its unchanging blue. BURNS: *O Luve Will Venture In.*

ing the bulbs early in September, can ; the plants to blossom by Christmas time. ıe home the flowers are grown in hyacinth es filled with water.

ıe hyacinth appears in a favorite old Greek ı, in which it is said to have sprung from ɔlood of the beautiful Spartan youth, Hya- ıus, the friend of Apollo. Zephyrus, jeal- because Hyacinthus favored Apollo, caused latter's quoit to strike and kill the youth e the two were at play. Grief-stricken, llo caused a purple flower to spring from drops of blood that fell from the brow Hyacinthus. R.D.M.

HYBRID, *hi'brid,* the offspring of parents of two distinct species, examples of which are found among plants, beasts, birds, fish and insects. Among animals the most common and most useful hybrid is the mule, which is half ass, half horse (see MULE). Hybridity has much greater practical value in the vegetable kingdom than in the animal. The advantages of crossing plants are numerous, the most important being increase of size and vigor, greater hardiness and ability to resist disease, improvement of quality and flavor and increased power of adaptability to different climates. A notable illustration of increase in size and vigor is furnished by the crossing of the English walnut and the California black walnut, which has a rate of growth double that of both parents combined. By the crossing of the common pear and the Chinese sand pear, the area devoted to pear growing has been extended several hundred miles southward.

In France when the grape industry seemed doomed to destruction because of the ravages of the *Phylloxera,* the grapes were saved by being crossed with an American species which was immune. A striking example of improvement in flavor is furnished by certain superior grades of smoking tobacco, the result of crossing the best quality of Havana tobacco with species having larger leaves. Potatoes have been made to double their yield per acre by means of the hybridizing process, and have also increased their content of starch from fifteen to twenty-six per cent. The remarkable success of Luther Burbank in crossing vegetables, fruits and flowers is representative of what can be done in this important line of industry. See BURBANK, LUTHER.

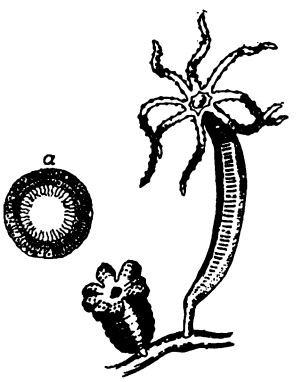
Consult Bateson's *Mendel's Principles of Heredity;* Jordan and Kellogg's *Scientific Aspect of Luther Burbank's Work.*

HYDERABAD, *hi der ah bahd',* the fourth city in population in India, and the capital of the state of the same name, which is known also as the Nizam's Dominions, is situated in the central part of lower India, east of Bombay. It is a wall-enclosed city, on the Musi River, which at this point is spanned by seven bridges, and the town is connected by rail with the railway system of India. In the vicinity is located the vast British military camp of Secunderabad. A striking feature of the city is the Char Minar, or "College of Four Minarets," built above four connected arches, at the intersection of the four principal streets. The Nizam's palace, the Mecca mosque and

the British residency are other points of interest. Hyderabad has extensive and costly waterworks. Population, 1911, 500,620.

HYDRA, *hi'dra,* in Greek legend, a monster which dwelt in Lake Lerna, in Argolis. It was credited with possessing many heads, of which the central one was immortal. The number of heads varied from nine to 100, any one of which being cut off was immediately replaced by two others, unless the wound was seared by fire. The destruction of this monster was the second labor of Hercules, and was accomplished with the assistance of Iolaus who, as each head was cut off, cauterized the wound. The immortal head was buried beneath a huge stone. See HERCULES, subhead *The Twelve Labors.*

HYDRA, FRESH-WATER, or **FRESH-WATER POLYP,** *pol'ip,* one of the simplest of the many-celled animals, an inhabitant of fresh-water ponds. It belongs to the same branch of the animal kingdom as the sea anemones, corals and jelly-fishes (see COELENTERATA). The hydra has a cylindrical body, which is about as thick as fine sewing-cotton and from one-fourth of an inch to half an inch long. At one end of the body there is a disklike expansion, or foot, with which it clings to bits of sticks, stones and leaves in the water; at the opposite end is a mouth from which projects a circle of delicate threads, called *tentacles,* varying in number from five to twelve or more.



HYDRA

One form of this strange water animal. The illustration *a* shows a cross section of the body, outlining the two layers of minute cells which compose the body walls.

Specimens brought into the schoolroom and kept in a dish of water in the light afford an extremely interesting study. If watched under a microscope the hydra will seem to be continually changing in form. Sometimes it stretches out its tentacles until they look like long, delicate threads; at other times it contracts its tentacles and its whole body until it has the appearance of a tiny egg with a group of wartlike knobs at one end. It is also able to move slowly from place to place. If some small water fleas are placed in the dish, its method of obtaining its food can be observed. The tentacles are provided with many fine little stinging threads, which the hydra shoots into the body of its prey, like a miniature lasso. These barbs have a paralyzing effect, and the captured insect is soon mastered and drawn by the contraction of the tentacles into the mouth cavity.

Hydras propagate for the most part by budding. That is, tiny knoblike growths appear on the body of the parent animal, which, as they become larger, gradually acquire tentacles. When fully developed they break off and begin existence anew as independent hydras. One of the most interesting facts in connection with the hydra is its power of multiplying by division. As a rule, if a hydra be cut into two or more pieces, each portion will in time develop into a new animal. Several species of this animal have been identified, two of which are common in America. One is bright green in color, due to the presence of chlorophyll, the coloring matter found in plants. The other is grayish-brown. B.M.W.

HYDRANGEA, *hi dran'je a,* the name given to about twenty-five species of ornamental shrubs of the saxifrage family, which are found

THE HYDRANGEA

in North and South America, China and Japan. The flowers vary from white to pink and bluish and are small individually, but they grow in large, showy clusters. When grown on some soils, the pink varieties will in time

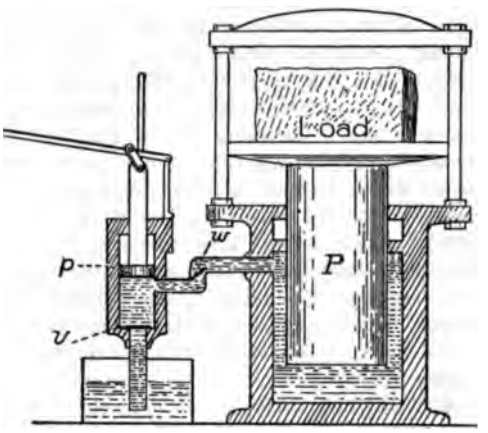
ce bluish blossoms. The common hy-
ea is a native of China, and was intro-
. into England in 1790. The wild, or
ican, hydrangea was brought into Euro-
cultivation from Virginia in 1796. The
er cultivated species are used in orna-
al borders. The *Hortensia,* or *Otoska,* is
arfed variety which is grown in hothouses,
is popular for Easter decorations. See
RAGE.

DRATES, *hi'drayts.* In chemistry com-
ds are usually divided into three chief
s, according to some characteristic prop-
they possess. These groups are known
ids, bases and *salts.* The bases are also
n as *hydrates,* or *hydroxides.* A base or
'droxide contains a metal in combination
oxygen and hydrogen. The oxygen and
gen form a group called *hydroxyl* (sym-
H), which in many chemical changes acts
n atom. An hydroxyl contains one atom
ygen and one of hydrogen, instead of the
atoms of hydrogen that enter with the
f oxygen into the composition of water.
oxyl does not exist free in nature, like
lements or the compounds, but it enters
nany combinations. It forms part of the
group of organic compounds known as
ols.

pical hydrates are the alkalies (see AL-
. The name alkali refers specially to the
rties of these compounds, and not to their
ical composition. The principal alkalies
austic soda, which is sodium hydroxide;
c potash, or potassium hydroxide; lime-
, or calcium hydroxide; ammonia water,
mmonia, or ammonium hydroxide.

DRAULIC, *hi drawl'ik,* **ENGINE,** a ma-
to utilize the power of falling water for
urpose of driving machinery, was first
ied by Sir William Armstrong. It is
efficient when working under a full load,
effectiveness decreasing with the load.
: types are in use: (1) water-pressure
es or motors; (2) water wheels; (3) tur-
(see WATER WHEEL; TURBINE WHEEL).
ly speaking, only the first is a true hy-
c engine. It is similar to a steam engine,
under pressure being used instead of
. The water is forced into a cylinder,
ng back the piston head until a sliding
is opened by which it flows out. As
a small part of the water pressure is
in driving the piston, there is great loss
ergy and these engines are relatively
ient, save when considerable power is
wanted at low speed. These machines have been largely displaced by electric motors, but are still used occasionally for elevators and for pumping air for pipe organs. C.R.M.

HYDRAULIC PRESS. For one man to lift hundreds of tons would seem an impossibility, or at least to be a task requiring very complicated machinery. In truth, however, a mechanism scarcely more intricate than a pump



ONE FORM OF HYDRAULIC PRESS
The explanatory letters are referred to in the text.

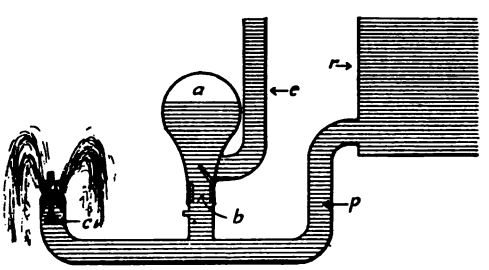
can transform the power of the human arm into enormous pressure. This mechanism is the hydraulic press. Until the invention of more rapidly-acting machinery it was in general use for pressing cotton, paper or hay into bales; for squeezing oil from cotton seeds; for punching holes in steel plates and for other operations requiring unusual power of compression. Its principle is also utilized for the hydraulic elevator, in which the ordinary pressure of water in city mains lifts the weight of a number of people.

A hand-power hydraulic press is shown in the illustration. That part of the apparatus which contains the small piston is really a force pump (see PUMP); when the handle is pressed down water or oil is forced past the valve *w,* and the piston *p* is raised. Back in the seventeenth century the great physicist, Pascal, whose biography will be found in these books, discovered that if you exert pressure upon any part of a liquid enclosed in a vessel an equal pressure will be exerted upon everything which the liquid touches, that is, the pressure is transmitted equally in all directions. If the area of the bottom of the smaller piston is one square inch and the larger piston has a diameter twenty-four times that of the smaller,

the area of the larger piston will be 576 square inches, each single square inch of which will receive pressure equal to that exerted on the square inch of water by the smaller piston. Thus, if the smaller piston exerts a force of 100 pounds, the larger piston will receive a pressure sufficient to lift 576 times 100 pounds, or 57,600 pounds. If the handle of the small piston is made a lever with a mechanical advantage of four (see LEVER) a man exerting a force of 100 pounds can lift four times 57,600 pounds, or 230,400 pounds, which is 115⅕ tons.

Of course the hydraulic press does not lift its load the entire distance in a single movement of the hand lever. If the small piston moves downward six inches it displaces six cubic inches of water, but this amount spread beneath the 576 square inches of the larger piston will raise the latter only $\frac{1}{576}$ of six inches, or 0.010 inch. As soon as the stroke is completed, the valve *w* closes; when the handle is drawn up more water enters through the valve *v*, and a second stroke can then be made. C.H.H.

HYDRAULIC RAM, a machine to use the momentum of falling water to lift water higher than the source of supply. In the diagram, water from the reservoir *r* flows through the pipe *p* and out through the valve *cv*. As the



HYDRAULIC RAM

The letters which serve to explain its operation are referred to in the text.

flow becomes faster the pressure closes the valve *cv*, suddenly checking the momentum of the water, as when the water from a hydrant is suddenly shut off. There is a back pressure which forces the water through valve *b* into the air chamber *a*. The air is compressed and by its pressure closes valve *b* and forces the water in the chamber up through the pipe *e*. Since only a small part of the total water flowing through pipe *p* is forced up through pipe *e*, the machine is not of practical value unless the source of supply is much greater than the amount needed. If the machine were perfectly efficient, one-fifth of the water in *p* would be raised five feet in *e;* but, as there is much loss by friction and waste, an efficiency of fifty per cent is high, and even that is rapidly diminished if the ratio of the fall to the height raised becomes greater than one to twelve.

HYDRAULICS, *hi drawl' iks.* When we open a faucet in our house to get a glass of water; when we see the embankments and levees which protect the lands along the banks of many rivers from disastrous floods; when we think of the great canals that have been built for improving communication by water; when we read of the great irrigation works which transform arid places into fertile plains or smiling gardens, we must remember that men have been able to accomplish all these works as the result of the knowledge they have gained about the natural laws that govern liquids in motion. The branch of physics which deals with the laws of liquids in motion or of flowing liquids is known as *hydraulics,* a name which is derived from the Greek, and means *pertaining to water.* The practical application of the laws of hydraulics has given rise to the science of hydraulic engineering, to which we are indebted for all the benefits named above.

Laws of Flowing Liquids. In this article can be given only a few of the fundamental laws to which liquids in motion are subjected. When water descends or flows it is subjected in theory to the same laws as all falling bodies (which see). If a hole be made in the side of a vessel containing water, the water flows out of the hole, or orifice, forming a jet. One important physical law regarding a jet of water is the following: the velocity with which a jet of water issues from the orifice is equal to that of a body falling from the surface of the water to the orifice. A descending jet of water will therefore acquire the same velocity that a stone would acquire in falling from the high level of the descending jet to the ground. A jet which issues from a dam through an orifice made ten feet below the surface of the water will have the same velocity as a stone which has fallen ten feet. It follows that the velocity with which a jet flows depends on the height of the liquid above the orifice.

Another important law is the following: a jet of water will rise to the level of its source. If a cistern is on a support twenty-five feet high, and a pipe leading to the ground and having the lower end bent upward is attached to it, a jet issuing from the pipe will rise theoretically as high as the surface of the water in

tern, that is, twenty-five feet. But on ac- of the resistance of the air and the n of the liquid against the sides of the he water never rises quite as high.

r of Water in Rivers. Water flows in a t, as in rivers, on account of the inclina- f the channel. An inclination of three per mile is sufficient to give motion to and to produce a velocity of three miles ur. But the flow is also affected by the of the channel as well as by the friction its banks and the bottom. Thus the t in a river moves more swiftly at the , where there is less friction, than near ores or the bottom.

er Supply of Cities. The necessity of ing a pure and plentiful supply of water es is one of the many instances in which ience of hydraulic engineering has to various difficult problems. The water- of some of the big cities are marvelous of engineering, which compel admiration e knowledge, skill and ingenuity of the ers who planned and constructed these

The chief problem which has to be in any of these undertakings is how to the water from the source to the place it is to be used. Sometimes the water be carried over great distances and this itates the construction of large aque- reservoirs and other similar works. comes the problem of distributing the in the city over a wide area by means great number of pipes of various sizes, bring it into the homes of the people. pipes must be arranged in such a way hey shall always contain a constant flow er under the proper pressure. Another m which has to be solved is to furnish a pressure in order to force the water to p of tall buildings. In cities like Denver os Angeles, which are situated near the ains, the water is conducted to the city ge pipes from reservoirs built on the ains. As water tends to rise to the level source, it will rise in the buildings to ight of the reservoir. This is known as *avity system* of waterworks. But in most such as New York, Boston, Philadelphia hicago, a special system of pumping has employed in order to attain a result ed thus easily in mountainous country. ious machines for using the force of fall- ater have been constructed and most of are described under their proper headings se volumes. C.R.M.

Related Subjects. The reader will be assisted to broader knowledge of hydraulics by reference to the following articles in these volumes:

Hydraulic Ram	Turbine Wheel
Hydrostatics	Water Wheel

HYDROAËROPLANE, *hi dro aer' o plane,* or **HYDROPLANE,** a flying boat, or in other words, any aëroplane designed to rise from and alight on the surface of the water, or be propelled upon the water. It was evolved in the simplest and most natural way from the earlier forms of aëroplanes, and had its origin in the mere adding, to the regular form of flying machine, of floats which should prevent the sinking of the machine if it happened to come down into the water. This called attention to other possibilities, and distinct forms were developed, some having floats instead of skids, some with regular boat bodies. This latter form bids fair to be the more popular. By no means have all the problems been solved, for while it is comparatively easy to make a machine which may be anchored upon or raised from smooth water, a turbulent water surface complicates matters. For a fuller discussion of hydroaëroplane, with its relation to other phases of aëronautics, see FLYING MACHINE.

HYDROCARBONS, *hi dro kar' bahnz,* are compounds of carbon and hydrogen. Some of them occur in nature as natural gas, petroleum, turpentine, asphalt, etc. Others are made artificially. The commercial products of petroleum, such as benzine, gasoline, kerosene, lubricating oils and paraffin wax, are mixtures of hydrocarbons. Coal gas contains hydrocarbons and so also the by-products in the manufacture of gas from coal. Acetylene, also used as an illuminating gas, is a hydrocarbon. The dangerous "fire-damp," which is the cause of many dreadful explosions in mines, is the hydrocarbon *methane,* which is also the principal constituent of natural gas and an important one in coal gas.

In chemistry the hydrocarbons are of great theoretical interest. It is the common practice to regard all the compounds of carbon as "derived" from the hydrocarbons. This does not mean that all such compounds are actually made from hydrocarbons, but only that it is convenient to classify them according to their theoretical relationship to the hydrocarbons. For this reason *organic chemistry,* the branch of the science which treats of the compounds of carbon, is often defined as "the chemistry of the hydrocarbons and their derivatives." Hydrocarbons are divided into two

great classes known as *aliphatic* and *aromatic*. Methane, acetylene and the petroleum hydrocarbons belong to the former group, taking its name from the Greek word *aliphe*, meaning *fat*, fats being derivatives of hydrocarbons of this class. The coal-tar products belong to the aromatic group (*aroma*, a *pleasant odor*). Examples are benzene (a different substance from benzine), naphthalene (familiar as moth-balls), and anthracene. It is principally from these aromatic hydrocarbons that coal-tar dyes are made. J.F.S.

Related Subjects. The reader is referred to the following articles in these volumes:

Acetylene	Coal
Aniline	Coal Tar
Chemistry	

HYDROCHLORIC ACID, *hi dro klo' rik as' id.* See HYDROGEN CHLORIDE.

HYDROCYANIC, *hi dro si an' ik,* **ACID.** See PRUSSIC ACID.

HYDROFLUORIC, *hi dro floo or' ik,* **ACID,** the only known compound of hydrogen and fluorine, is a very strong, poisonous acid found in liquid form or as a colorless gas. It is chiefly used for etching on glass, and in chemistry in the analysis of substances containing silica, which it changes into vapor. It attacks most metals violently, but will not affect lead; it is therefore stored in lead, wax or gutta-percha containers. Even when highly diluted with air, it is injurious to the lungs, while to breath the pure vapor means death. In etching, the plate to be etched is coated with wax, the design is scratched through to the glass, and the plate is exposed to the acid. When the wax is melted off, the design is bitten into the glass. See FLUORINE. J.F.S.

HYDROGEN, *hi' dro jen,* from Greek words meaning *water-producing,* is a tasteless, odorless, colorless elementary gas. It is found in the gases from volcanoes, certain oil wells, the Stassfurt, Germany, salt beds, and in the gases formed in the decay of animal and vegetable tissues. It is also known to be part of the atmosphere of the sun, and has been discovered in meteorites. When water is decomposed it yields one-ninth of its weight of hydrogen. Such decomposition of water is most readily brought about by passing an electric current through the water. Pure water is a very poor conductor of electricity. To make the current pass well we add to the water about one-tenth its weight of sulphuric acid or of caustic soda. Hydrogen then comes off at one of the wires (electrodes or poles) by which the current is led into the water and oxygen from the other. The volume of hydrogen obtained is twice as great as that of the oxygen, but its weight is only one-eighth as great, because oxygen is sixteen times as heavy as hydrogen. Hydrogen is the *one essential element in all acids;* hence it may be obtained by the decomposition of an acid by a metal. It has great affinity for oxygen, with which it forms water. A mixture of hydrogen and oxygen ignited by a flame or an electric spark explodes most violently. Hydrogen is called a reducing agent because of its power of withdrawing oxygen from compounds containing large proportions of that element. Thus if hydrogen is passed over heated iron rust, the rust is reconverted into iron.

It burns with a very hot, colorless flame, but other substances will not burn in it. The oxy-hydrogen flame is an application of its affinity for oxygen to industries where very great heat must be obtained. A stream of hydrogen burns in a stream of oxygen, the two uniting without explosion to form water. It will not support life, although breathing it is not directly injurious. It has the effect of raising the pitch of the voice to a high, thin squeak. It is the lightest of all gases, and is therefore sometimes employed to raise balloons. See OXYGEN.

Hydrogen is used to convert liquid fats into more valuable solid fats. This process is called *hydrogenation.* J.F.S.

HYDROGEN CHLORIDE, *klo' ride,* is the only known compound of hydrogen and chlorine. It is a pungent, fuming, colorless gas, one and one-fifth times heavier than air. It dissolves easily in water, and the solution is the commercial hydrochloric, or muriatic, acid. Hydrochloric acid occurs in the gases of volcanoes and in the water of rivers flowing through volcanic regions. It is found also in very dilute form in the digestive juices of men and animals, and hence is sometimes given as a tonic. It attacks most metals, evolving hydrogen and forming the chloride of the metal. A mixture of hydrochloric and nitric acids in the proportion of two to one is called *aqua regia,* meaning *royal water,* because it will dissolve gold, "the king of metals."

Hydrochloric is one of the strongest (or most active) acids, and with the exception of sulphuric it is the cheapest of all acids. It is obtained as a by-product in the manufacture of soda from salt, and is used largely for the production of the elementary gas chlorine (which see) and of the chlorides of the metals.

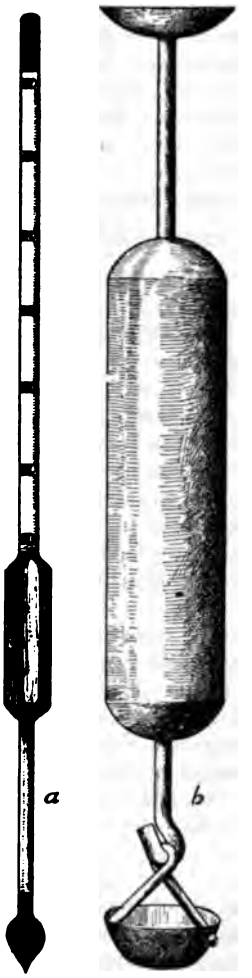
s employment also in dyeing and in the acture of dyes, in the treatment of bones e production of glue, gelatin and bone- and in many other industrial processes. DROGEN; CHLORINE. J.F.S.

DROGEN PEROXIDE, *per ox'id,* also as HYDROGEN DIOXIDE, PEROXIDE OF HY-, or OXYGENATED WATER, is a compound gen and hydrogen containing twice as oxygen per pound of hydrogen as does Because it contains more oxygen than rmal compound water, it is very un- easily giving up oxygen and becoming Oxygen so set free is called *nascent* rn), and is very active chemically, easily with other substances with which es in contact; for instance, black lead le is oxidized to white lead sulphate XIDATION). This property makes it valu- s an antiseptic in medicine, and as a ing agent, especially for hair, feathers vory, which are injured by cheaper ing agents. Hydrogen peroxide is com- sold as a three per cent solution in The pure substance is rarely made. colorless liquid, heavier than water, and cult to keep on account of its tendency mpose. J.F.S.

DROGEN SULPHIDE, *sul'fide.* See SUL- ED HYDROGEN.

DROGRAPHY, *hi drog'ra fi,* that branch sical geography which treats of the sur- aters of the earth. It is concerned with ining and making known the condition epth of navigable waters, both oceanic and, and the making of charts and maps g the coast formation, channels, reefs, and also currents, tides and winds. The States coast and river surveys are con- under the direction of the Hydrographic ment at Washington. This service is nportant to the commercial and marine ts of the country. Great Britain, being time nation, has a very thorough and ve governmental department of hydrog- and this service for Canada has always olunteered by Britain.

ROMETER, *hi drom'e ter,* an instru- o determine the density of liquids. It s usually of a slender sealed glass tube bulb at one end containing mercury or ut may have a cup at the end to hold ight: The weight is required to hold strument in a vertical position in the The depth to which the instrument n water is marked zero, and the rest of the stem is scaled like a thermometer. In any liquid other than water it sinks to a depth greater or less than it would in water; the density of the liquid may thereby be read. Hydrometers used to test the purity of milk are called *lac- tometers;* of alcohol, *alcoholometers;* and the strength of the brine in the boilers of seagoing ships, *salinometers.* See GRAVITY, SPECIFIC.



HYDROMETERS
(*a*) Beaume's hydrometer.
(*b*) Nicholson's hydrometer.

HYDROPHOBIA, *hi dro fo'bi a,* a dread disease, the name of which means *fear of water.* It results from the bite of a mad dog or other animal suffering from hydrophobia, and first shows itself by inability to swallow, not only water but even the secretions of the mouth; unless progress of the malady is arrested convulsions and death follow. It is now possible to save the victim by use of Pasteur treatment, which is available all over the civilized world, but which should be used immediately after the accident; once the disease develops the treatment is valueless. The period of time elapsing between the bite and the convulsions is so variable (from one week to two years) that the Pasteur treatment should be used in every suspected case, inasmuch as cases so treated rarely develop the disease.

Treatment. When a person is bitten, the victim should suck the wound, if possible, and hasten to the nearest physician, who will promptly burn the wound with a hot iron or nitric or carbolic acid. Then the patient should be taken at once to the nearest place

where the treatment can be administered. Many state and provincial governments and some local boards of health now provide the Pasteur treatment. The head of the dog should be sent to the nearest laboratory for examination of the brain; this should always be done, for if the active cause of hydrophobia be not found it will greatly ease the victim's mind, and if it is found the Pasteur treatment can be promptly given. Once convulsions set in, the case is hopeless. W.A.E.

Consult Keirle's *Studies in Rabies.*

HYDROSTATIC, *hi dro stat' ik,* **PRESS.** See HYDRAULIC PRESS.

HYDROSTATICS, *hi dro stat'iks,* the term now generally applied to the laws that govern fluids at rest; that is, the laws of liquid and gas pressure. Formerly the study of gas pressures was known as *pneumatics.*

(1) The primary law of hydrostatics is Pascal's theorem, *that fluids transmit pressure equally in all directions.* This is easily shown with water, which is far less compressible than a gas. If a bottle whose neck has an opening one square inch in area is filled with water, and a weight of one pound is placed upon the cork, the pressure of the water over each square inch of the inside of the bottle is one pound; or, there is a total pressure of as many pounds as there are square inches on the inner surface of the whole bottle.

(2) The second law is *that the pressure is proportional to the depth and independent of the shape of the vessel.* The more water in the bottle the more pressure will there be on the bottom. The shape, however, is not important, for by the first law pressure is equally distributed. This must be taken into account in the construction of high reservoirs or in harnessing water to drive hydraulic engines.

(3) The third law, known as Archimedes' principle, states *that the buoyant force on an immersed body is equal to the weight of the fluid displaced;* or, *a body is buoyed up by a force equal to the weight of the fluid displaced.* It is on this principle that steel ships are built. Steel itself is about eight times heavier than water, but the whole ship displaces a volume of water much greater than the volume of steel in the ship. A balloon will float in the air because it is filled with hydrogen, which is lighter than the same volume of air.

Gas Pressures. The laws of hydrostatics apply equally to gases, but two others which apply to gases only are more directly important. They are the laws of Charles and Boyle. Boyle's law states *that the volume of a given mass of gas at a constant temperature is inversely proportional to the pressure;* that is, *as the pressure increases the volume decreases.* Charles' law says *that if the pressure remains the same, the volume is directly proportional to the temperatures;* that is, *as the temperature rises, the gas expands.* These laws are the basis of all scientific work that involves the motion, elasticity, density, condensation, rarefaction, resistance and weight of gases. See GAS. G.L.

HYDROSULPHURIC, *hi dro sul fu' rik,* **ACID.** See SULPHURETED HYDROGEN.

HYDROTHERAPY, *hi dro ther' a pi,* a word of Greek derivation, meaning literally *the treatment of disease with water.* As generally understood, the term refers to the systematic use of water at varying temperatures, and with varying methods of application, for the relief of diseased conditions. As an aid to internal surgical treatment it is to be considered of value and has been of service in kidney and liver troubles, nervous disorders of obscure origin, skin troubles and those affecting nutrition. The term includes internal as well as external application of water, which, accordingly, may be swallowed, used as an injection into various body cavities or applied externally, hot or cold, locally or generally, as the needs of the patient demand. Water treatment is administered at such well-known European watering places as Marienbad, Ems, Vichy and Bath, and patients may test the virtues of hydrotherapy in America at Mount Clemens and Battle Creek, Mich., Hot Springs, Ark., Hot Springs, Va., Colorado Springs, Colo., Saratoga Springs, N. Y., and other places of less renown.

HYENA, *hi e' na,* a skulking, wolflike animal, whose wild howl, sounding like the shrieking laugh of a maniac, fills the night with terror as it prowls about after dark in search of food. The most marked physical attribute of this animal is its powerful jaws, which can easily break the bones of an ox, although its main food is the flesh of dead animals.

The hyena has prominent, ferocious eyes, long, erect ears and very short hind legs which give its body an awkward, hump-backed appearance. There are three species, all of which have long, brown, coarse hair, but are distinguished by their markings. The most typical and familiar form is the striped hyena, which

through Southern Asia from Abyssinia lia, while the other two, one spotted and rown, are found over much of Africa,

THE SPOTTED HYENA

of the Sahara Desert. All three species a very disagreeable odor, which is another ir unpleasant characteristics.

GEIA, *hi je'ya,* in Greek mythology, the ss of health and the daughter of Aescu-, with whom she was worshiped at Athens, h and elsewhere. She is represented in companied by her father, or sometimes with a snake at her side, the symbol of g power delegated to her from Apollo. ally Hygeia was an independent goddess, ater was joined with other deities who identified with the cure of disease. The of the modern word *hygiene* is thus ac-d for.

GIENE, *hi'ji en,* or *hi'jeen,* from a h word and a Greek word which mean *healthy,* is the name applied to that a of medical science which concerns with the preservation of health. Though s not include the practice of medicine or gery, it is regarded as a branch of medi-ience because it has to do with the pre-n of disease. Medicine is administered rgical operations performed to make the ell; the well apply the laws of hygiene ler to keep well.

giene may be divided into four main nes: personal, domestic, public and mili-ygiene.

sonal Hygiene. To live hygienically one understand the needs and character of ysical organism. First of all, he must how to select his daily food, for good depends primarily on proper nourish-

The elements, nutritive and fuel value, ligestibility of the foods in common use lly treated in these volumes in the arti-Food and Diet. Closely connected with bject of foods is that of beverages. Tea offee are both stimulants, but neither has nutritive qualities. Excessive use of either is as much to be avoided as indulgence in wine, beer and distilled liquors and narcotic drugs. Every person who desires to keep well should drink at least six glasses of pure water each day, one on rising, two between breakfast and luncheon, two between luncheon and dinner and one on retiring. The moderate drinking of water at meals is also advocated by many physicians.

The selection of clothing is another factor in personal hygiene. One should vary his dress according to his age, occupation and the season of the year. Common sense requires that rubbers be worn in damp weather and that warm underwear be chosen for the cold months. The clothing should not be too tight-fitting nor should it in any way restrict the freedom of the bodily movements or the circulation. Women and girls should shun extremely high heels, which throw forward the weight of the body to an abnormal degree, long walking skirts that gather up the filth germs in the street, and the tight stays that by their pressure may injure the internal organs.

Everyone who works indoors the greater part of the day should take some form of daily exercise, preferably in the open air. Physical activity is a necessity if the bodily organs are to develop properly and carry on their functions regularly. Rest and sleep are equally important. The person who is weakened by overwork and insufficient sleep is in just the condition to succumb easily to disease. One should sleep at least eight hours a day, as a rule, and care should be taken to have the sleeping room thoroughly ventilated. No one who sleeps in stagnant air can rest properly.

Personal cleanliness is all important. Unless the entire body is bathed frequently the oil and waste products secreted by the glands of the skin will clog up the pores and prevent the skin from doing its share of eliminating waste matter. The hair, nails, nose and mouth cavities and teeth should all be looked after carefully. Inasmuch as dirt and dead particles of skin are continually being rubbed off on the clothing, the garments worn next to the skin should be changed frequently, and the clothing worn during the day should always be removed when one goes to bed.

Domestic Hygiene. This division covers the hygiene of the home, and includes such matters as the preparation of meals, the cleaning and airing of rooms, ventilation and heating,

and the care of invalids and children. When a household is conducted according to the principles of hygiene it is safe to expect that the health and happiness of the members of that household will be well guarded.

Public Hygiene. The health of the public is a subject which received little attention until the beginning of the nineteenth century. The terrible epidemics that formerly swept away vast numbers of victims throughout the world (see CHOLERA) are a proof of the deplorable ignorance that once prevailed concerning sanitation and its benefits. Each town or city now has its department of public health. It is the duty of the health department to see that the drainage, water supply and ventilation of buildings are up to the modern standard of excellence, that streets are kept free from filth, garbage and other refuse disposed of, street-cars and other public conveyances kept in a sanitary condition, and that laws respecting vaccination and quarantine are enforced. In general, boards of health are established to safeguard the health of the community in every possible way.

Military Hygiene has to do with the preservation of the health of the soldier. When large numbers of men are in camp or on the battlefield the problem of maintaining sanitary conditions is very serious. The remarkable progress made in military sanitation in recent years is indicated by the comparative absence of epidemic diseases among the armies which fought in the War of the Nations. Because vaccination has become so nearly universal, the armies of Western Europe, though they came into contact with troops from Asia and Africa, were not attacked by smallpox; and that other terrible enemy of the soldier, typhoid fever, was also held in check through the use of vaccine and enlightened methods of sanitation.

Another striking illustration of what may be accomplished on a large scale by the application of the laws of hygiene is the work of the United States army in the Panama Canal Zone (see PANAMA CANAL). What was formerly a region infested with disease and filth has been made one of the most healthful spots on the globe. Cuba, too, has been made hygienically safe by means of sanitary measures and the extermination of those dangerous carriers of germs—the fly and the mosquito. B.M.W.

Consult Allen's *The Man Wonderful;* the *Marvels of Our Bodily Dwelling;* Davison's *The Human Body and Health;* Jewett's *The Body and Its Defences;* Pyle's *A Manual of Personal Hygiene.*

Related Subjects. This important subject is given full treatment in these volumes. The reader is referred to the following articles:

Antitoxin	Gymnastics
Athletics	Health
Baby	Health Habits
Baths and Bathing	Heating and Ventilation
Board of Health	Home Economics
Breath and Breathing	Immunity
Child	Life Extension
Cookery	Mastication
Dentistry	Medicine and Drugs
Diet	Mental Handicaps
Digestion	Mosquito
Disease	Nutrition
Education, subtitle	Physical Culture
Hygiene of Education	Quarantine
Fatigue	Sanitary Science
Fletcherizing	Sewer and Sewerage
Fly	Teeth
Food	Vaccination
Garbage	

HYGIENE OF EDUCATION. See subtitle, in article EDUCATION, page 1944.

HYGROMETER, *hi grom' e ter,* an instrument for determining the amount of moisture in the air, or as it is expressed in the reports of the Weather Bureau (which see), the *humidity* of the atmosphere. Numerous experiences tell us that there is more moisture in the air at one time than at another. Clothes hung out to dry will dry very slowly just before or just after a rain, but they dry rapidly on a bright, warm day. Cool days are usually damp and bring clouds and fogs, while warm days are more likely to be clear and dry. This is because the atmosphere can contain more water vapor at a high than at a low temperature. When it has all that it can contain at a given temperature it is said to be *saturated,* and the difference between the amount of moisture that the atmosphere contains at a given temperature and the amount necessary to saturate it is the *relative humidity.* The hygrometer enables us to determine the relative humidity.

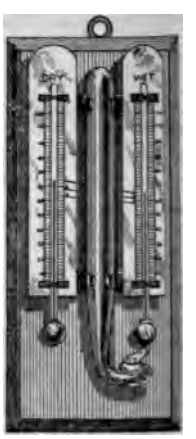


FIG. 1
Mason's hygrometer, the form which is most common.

The hygrometer used by practically all government weather bureaus, and also the one most frequently seen, consists of two thermometers attached to the same support. One

ometer (the dry) indicates the tempera- f the atmosphere; the other (the wet) s bulb covered with muslin or candle- g, which is kept moist. The evapora- f the water in the muslin reduces the rature of the wet bulb until moisture s on the tube of this thermometer. The rature at which moisture begins to col- the *dew point*, or point of saturation of mosphere. By reference to tables which

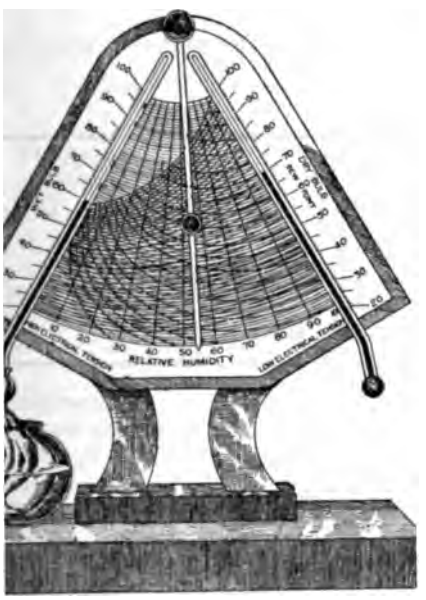


FIG. 2
he "direct-reading" type of hygrometer.

been carefully worked out the observer le to determine at once the degree of lity.

the best results the hygrometer should ounted so that it can be rotated rapidly, strong current of air should be forced t it by an electric fan. Fig. 2 shows a ading hygrometer constructed on the principle. By use of the indicator the lity is easily determined. See HUMIDITY.

KSOS, *hik'soze*, a line of kings which for an uncertain period of time in Egypt, ning about 1700 B.C. They belonged to ering tribes which came in with their and took possession of the Nile delta, or this reason were called the *Shepherd* . They are believed to have been the to introduce horses and chariots into tian warfare. The Pharaoh of the time of h is supposed to have been one of the os.

HYMEN, *hi'men*, originally the name of a marriage song among the Greeks, but later applied by them to the god of marriage, whose blessing was invoked at every wedding. He was generally regarded as a son of Apollo and a Muse, but sometimes of Dionysus and Aphrodite. In art he is represented as a youth of delicate beauty, wearing a crown of flowers and carrying a torch.

HYMENOPTERA, *hi men op'ter a*, a Latin word formed from two Greek words, *hymen*, meaning *membrane*, and *pteron*, meaning *wing*, hence *membrane-winged*. It is the name of an order of insects which includes ants, bees, wasps, etc. See INSECTS.

HYMNS, NATIONAL, are songs accepted by the people of a country as embodying expressions of national sentiment, generally inspired by some great crisis through which a nation has passed. National hymns divide themselves into two classes: the popular tunes or songs which are peculiar to a certain people or which are universal among them; and the hymn or hymns which, by legislative enactment, royal decree or by precedent, are sung or played on ceremonial occasions or at public gatherings. Sometimes the two are the same. Patriotic songs, or *national anthems*, are closely intertwined with history and most generally spring up spontaneously in response to some urgent need; seldom are they deliberately thought out and created according to a preconceived plan.

Every country has its song or ballad which serves as inspiration in times of peril. Patriotic feeling always seeks utterance in verse and music; and the powerful influence of the song and ballad in bringing about great changes in national life, whether religious, reformatory or revolutionary, can be attested to in the history of every country in the world. There are four stages in the history of the development of national music: folk music; national music, involving folk music; music in praise of ruler or institutions; and patriotic music, the *national hymn*. The following list gives the specified or accepted national hymns of the various important nations:

Austria; *Gott erhalte unsern Kaiser* (God preserve our Emperor). Music by Haydn; words by Hauschka (1797).

Brazil; *Hymn of the Proclamation of the Republic.* Words by Miguez.

Canada; *Maple Leaf.* See MAPLE LEAF.

Danish; *Kong Christian.* Words by Ewald; music by Johann E. Hartmann.

Dutch; *Wien Neerlandsch Bloed.* Words by

Henrik Tollens; music by J. W. Wilms (1800).

France; *La Marseillaise.* Claude Joseph Rouget de Lisle (1792). See MARSEILLAISE, THE.

Germany; *Die Wacht am Rhein.* Max Schneckenburger (1840). See WACHT AM RHEIN.

Great Britain; *God Save the King,* probably by Henry Carey (about 1740).

Greece; *Sons of Greece, Come, Arise.*

Italy; Air—*Royal March,* by Gabetti.

Japan (translated); *May the Empire Last.*

Mexico; *Mexicans at the Cry of War,* by Nuno.

Norway; *Song for Norway.* Words by Björnson; music by R. Nordraak.

Russia; Before the forced abdication of Czar Nicholas in March, 1917, the national hymn was *God Protect the Czar.* Words by Zhukovsky; music by General Alexis Lwoff (1830?).

Spain; *Himn de Riego.* Music by Herta.

Sweden; *Out of the Swedish Heart.*

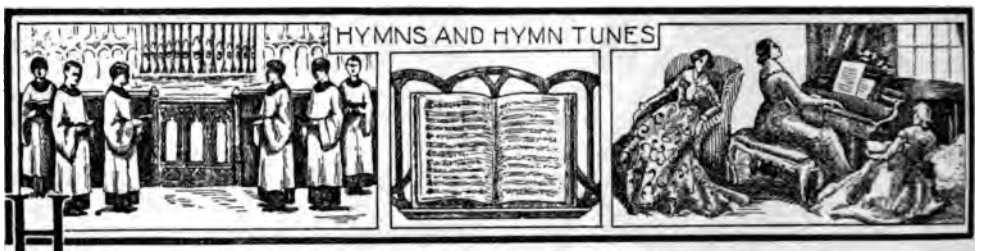
United States; *Star Spangled Banner.* Words by Francis Scott Key, music by John S. Smith; and *Hail Columbia;* words by Joseph Hopkinson (1798). See STAR SPANGLED BANNER; HAIL COLUMBIA.

The following are popular hymns widely used upon patriotic occasions in the various countries named:

United States; *Yankee Doodle, Dixie, My Country 'Tis of Thee, The Battle Hymn of the Republic, Marching Through Georgia, Columbia the Gem of the Ocean.*

Germany; *Heil dir im Siegerkranz* (Prussia); *Deutschland über Alles.*

See HYMNS AND HYMN TUNES. R.D.M.



HYMNS AND HYMN TUNES. The songs which bring peace and comfort, hope and faith to all hearts have been a part of religious services from the earliest days of history. Rhythm and melody naturally react upon the religious sentiment of people and create an influence for good which it is impossible to estimate in words. For the origin and idea of Christian hymnody we must look to Hebrew sources. The core of the Hebrew religion and worship lay within its religious songs, and it is generally conceded that the Hebrew *Psalter,* taken as a whole, has never been equaled. These songs include the famous *Song of Miriam, The Nineteenth Psalm,* the *Song of Deborah* and the *Song of Barak.* Solomon and David are regarded as the great psalmists of Israel. In the New Testament the hymn note is changed—exalting a Person and not a race. The saintliness of the early Christian ages survives in many Greek and Latin hymns, among them being *Come, Holy Spirit,* which belonged to the early medieval period; *Dies Irae (Day of Wrath),* by Thomas de Calano (who died in 1226); and *Stabat Mater (The Mother Stood),* by Jacobus de Benedictis (who died in 1306).

The Protestant Reformation was borne forward on waves of sacred song, and by the introduction of the use of the language of everyday life and popular music for hymns, Martin Luther exerted a permanent influence on hymn-writing, not only upon Germany but upon all Europe. His own hymns, thirty-seven in number, of which about twelve are translations or adaptations from Latin originals, are among the best-known of the Church. The favorite of these, *A Mighty Fortress is Our God,* is known as the "Battle Hymn of the Reformation."

After the Reformation, the development of hymnody was retarded in England. However, not to be overlooked are the hymns of Milton (written about 1629) and those of Jeremy Taylor (1630-1667). The English Independents, as represented by Isaac Watts (1674-1748), have a just claim to be considered the real founders of modern English hymnology. Watts' hymns, which were very numerous and popular, were written especially to follow sermons, reinforcing the truths brought out. Many of his songs are sung in churches of the present day, especially *O God, Our Help in Ages Past* and *When I Survey the Wondrous Cross.* The Wesleys and the men who gathered about them were prolific hymn writers, and they produced some of the best hymns in the history of the Church. Charles Wesley (1707-1788) alone wrote over 6,000 hymns, almost 400 of which are still commonly used.

The hymns of more modern days seem to have been inspired by some religious move-

or belief, as the Missionary Movement, xford Movement, and the evangelistic nent of Moody and Sankey. Each has ced notable hymns rarely sectarian and y appropriate to their purpose. The ter of the music of many of these is different from that of the earlier hymns; e of their more catchy qualities, their upon church music in general possibly t contributed to deep devotion as surely their more serious predecessors.

ong the American hymn writers of note Oliver Wendell Holmes, John Greenleaf ier, Phoebe Cary, Philip Paul Bliss, Julia Howe, Ray Palmer, Phillips Brooks, s M. Gabriel and the blind hymn writer, Crosby.

following is a list of some of the most orthy hymns in common use in the es:

Lover of My Soul.....Charles Wesley
Kindly Light.....John Henry Newman
With Me.....Henry Francis Lyte
of Ages.....Augustus M. Toplady
is a Land of Pure Delight....Isaac Watts
Greenland's Icy Mountains.Reginald Heber
, My God, to Thee...Sarah Flower Adams
s I Am, Without One
.....Charlotte Elliott
weetly Solemn Thought.....Phoebe Cary
n the Arms of Jesus.....Fanny Crosby
ith Looks Up to Thee.....Ray Palmer
to Steal Awhile Away...Phoebe H. Brown
My Soul, Stretch Every
e .....Philip Doddridge
ity Fortress is Our God.....Martin Luther
My Soul.....John Keble
d, Christian Soldiers..Sabine Baring-Gould
Thou Fount of Every Bless-
.....Robert Robinson
and Evening Star.....Alfred Tennyson
Happy is the Pilgrim's Lot....John Wesley
Up, Stand Up for Jesus....George Duffield
de the Tie that Binds.....John Fawcett

Ten World-Famous Hymns

s, Lover of My Soul, by Charles Wesley, of the noblest songs of modern times em- g Christian faith and hope. It was writ- 1740, and several incidents are said to have ted its composition. A terrible storm on Hantic, in which Wesley had a narrow from death, is claimed by some to have d him to present in verse the thoughts and ons of a Christian in moments of greatest . Like the *Rock of Ages,* this song was n in Great Britain, and both found in ca the tunes with which they have become tely associated. To the tune of *Martyn,* by n B. Marsh, the hymn *Jesus, Lover of My* as been borne to every land and to the of millions who plead for hope and faith mfort.

t of Ages, by Augustus Montague Toplady 1778), like the preceding hymn, is a direct and personal appeal to God. Of it one noted authority has said that "no other hymn has swept the chords of the human heart with a more hallowed touch." It first appeared in an unfinished form in the *Gospel Magazine* of October, 1775; its author, a brilliant young priest, survived its publication only two years, but he lived long enough to give to the religious world one of its greatest songs. It has found appropriate musical setting in the tune *Toplady,* by Dr. Thomas Hastings.

Abide With Me, by Henry Francis Lyte (1793-1847), was inspired in a memorable walk by the sea. Its author, a frail, sensitive minister who lived in Brixham, England, was warned to seek the milder climate of Italy, as he, like Toplady, was a victim of consumption. To live away from the sea and the hardy fisherfolk whom he had grown to love seemed impossible. What he felt and what he suffered on his last memorable walk beside the waters which he was about to leave forever no one will know, but in those moments of lonely soul communion, his great hymn had its birth. He died at Nice, France, three months later. The music for his hymn was composed by Dr. Monk, the musical editor of *Hymns, Ancient and Modern.*

Just As I Am, by Charlotte Elliott (1789-1871), one of the greatest of evangelistic compositions, has possibly touched more lives helpfully than any other hymn, by giving people a sense of their religious needs. It first appeared anonymously in the *Yearly Remembrancer* in 1836. When Miss Elliott was thirty-two her health failed. While residing at Brighton, England, she became oppressed by the thought of her apparent uselessness as she watched every member of her family busied in the preparation of a bazaar which was to help raise money for the erection of a college at Brighton. She alone was too weak to lend a hand. For a long while she sat lost in thought. Then a feeling of peace and contentment came over her, and in this mood she wrote the verses which have endeared her name to posterity.

Nearer, My God, to Thee, by Sarah Flower Adams, was suggested by the story of Jacob's vision at Bethel, as found in *Genesis* XXVIII, 10-22. It was first published in 1841, but did not meet with great favor until Dr. Lowell Mason's beautiful music gave it a permanent place in the hearts of devoted people the world over.

Onward, Christian Soldiers, by the Rev. Sabine Baring-Gould, is the greatest of processional hymns, and was originally written for children. A great school festival was to be held in a Yorkshire village on Whit-Monday, 1865, and the pupils of the Horbury Bridge School, over which the author was curate, were invited to attend. As the place of celebration was a considerable distance away, the minister composed this stirring hymn to be sung by the children while they were marching from one village to another on their way to the festival. The spirited music for it was composed by Arthur S. Sullivan.

From Greenland's Icy Mountains, by Reginald Heber (1783-1826), is a famous missionary hymn. Like the preceding hymn, it was written at a sitting and for temporary need, with no thought of its great usefulness in the future.

Heber's father-in-law, Dr. Shipley, the vicar of Wrexham, requested him to write something for his congregation to sing the following morning, Whitsunday, 1819. Heber retired to a distant part of the room and on the spur of the moment wrote the five verses which have since remained the matchless missionary hymn of Christendom. The melody to which it is sung in America was composed by Dr. Lowell Mason; like the verses, the music was written at a sitting.

My Faith Looks Up to Thee, by Ray Palmer (1808-1887), is another splendid declaration of trust and confidence in God. It was written in 1875, and the author had not the slightest thought of its ever being adopted as a song for worship. Conscious of his own spiritual needs, Dr. Palmer put upon paper the thoughts which filled his mind as he sat one afternoon in the quiet of his own room, away from all outward excitement. Dr. Lowell Mason also composed the melody for this hymn.

Stand Up, Stand Up for Jesus, one of America's most popular and soul-stirring hymns, was written by Dr. George Duffield (1818-1888) and repeated at the close of his sermon to give emphasis to the dying words of his friend, the Rev. Dudley Tyng. When he realized that the end was near and he was asked what he wished to say to his friends and associates, Tyng whispered his dying message: "Tell them, 'Let us all stand up for Jesus.'" These words were immortalized by Dr. Duffield in his hymn to follow his sermon of eulogy for his young friend.

Lead, Kindly Light, by John Henry Newman (1801-1890), is the author's prayer of a storm-tossed soul for guidance to the light. The poem was written in 1833, while the author was in Southern Europe because of ill health. The spiritual unrest of the day, the result of the Oxford Movement, which in 1845 led Newman to unite with the Roman Catholic Church, had begun to fix its grip on him. It was during this period of anxiety for the future of the Established Church that the noble hymn was written. While on a boat bound for Marseilles, during a great calm that quieted the waters of the Mediterranean, the brilliant young minister, longing for home and weakened by mental and physical suffering, wrote his fervent prayer. The musical setting for it was composed by Dr. John B. Dykes as he walked along the Strand, in London. R.D.M.

Consult Butterworth and Brown's *Stories of the Hymns and Tunes;* Morrison's *The Great Hymns of the Church: Their Origin and Authorship.*

HYPATIA, *hi pa'she a* (about 355-415), a wise and beautiful Greek woman and a philosopher, who appears as the heroine in Charles Kingsley's *Hypatia.* Her father gave her all the training in philosophy which could be obtained in that age, and she was equipped to succeed him as a lecturer at Alexandria. Her fame drew students from all parts of the East. Cyril, the bishop of Alexandria, grew jealous of her power, and one evening some of the lower clergy, whose anger had been kindled against her, seized her as she was returning home in a carriage. They dragged her through the streets of Alexandria to a church called Caesareum, where she was murdered.

HYPERION, *hi pe'ri on,* in the oldest legends of Greece, was one of the twelve children of Uranus and Gaea, who constituted a race of giants known as the Titans (which see). Uranus, fearing the power of his gigantic offspring, shut them up in the lower regions, but Gaea loosed the bonds of Cronus, the most daring of the twelve. He then set free his brothers and sisters and to each gave a portion of the world to govern. To Hyperion was assigned the direction of the sun, which he drove across the sky each day in a golden chariot. In later mythology Hyperion was identified with Apollo, god of the sun. See APOLLO.

HYPNOTISM, *hip'no tis'm.* The state of hypnosis is one of partial sleep, with peculiar loss and retention of powers under the influence of an increased suggestibility. This condition comes under the conception of *dissociation* (see SUBCONSCIOUS). Such trancelike states (like sleep-walking, religious possession, and possibly the state in which the oracles gave pronouncements) have been known from ancient times. Historically it is not necessary to go back farther than the practices of healers in curing disease in the seventeenth and eighteenth centuries. Some of these used religious methods (exorcism), while all made a forcible appeal to faith (see FAITH CURE). They may or may not have induced an abnormal state, but clearly made use of the exalted suggestibility of the patients. Two other notions that prevailed were (1) that the cure was due to some cosmic force similar to that employed in magic (which see), and (2) that the power resided in the special gift of the healer.

F. A. Mesmer (1733-1815) revived these notions in his doctrine of "animal magnetism," a theory that he first stated in his medical thesis on *The Influence of the Planets on the Human Body.* He began by using magnetic plates in his treatment, but soon announced that the magnetic fluid flowed from his own person. Mesmer's career was determined by the cures rather than by the procedures and by his skill in appealing to the popular imagination. He went to Paris from Vienna in 1778 and soon had an enormous following. He devised the *baquet,* or wooden tub filled with bottles, powdered glass, iron filings, etc., from which projected iron rods which the patients touched. An impressive manner and surroundings, slow music, the passes and strokings, prestige, con-

ı, the expectation of benefit—all contrib-
to the effect. In his later stages he relied
ly upon his personal administrations and
ed to magnetize a glass of water, or a
which in turn produced the curative ef-
all of which were ascribed to animal
etism.

smer held to the medical theory of crises
rning points in a disease; his procedure
ccordingly a means of evoking crises, and
drawing the symptoms out of the patient.
more violent patients fell into convul-
; some shouted, cried, laughed and moved
; others perspired, groaned, coughed, had
ıs, and then went into stages of languor
xhaustion. As the crises passed off, after
r or many treatments, the patients were
ssed as cured. Both the scenes in the
of Cri..es" and the nature of the cures,
scribed by medical men and the patients
selves, strongly suggest the presence of
rical maladies and the operation of a men-
estige; while equally the dispute over the
y of the cure, the frequent relapses, the
than occasional deaths under his hands,
how often the alleged cures were *false,* or
t temporary relief or due to self-delusion.
e excitement created by Mesmer's popu-
and his personal ambition led to a chal-
of the medical profession and the appoint-
of a commission (one of several) to
ine his pretensions. On this commission
d such distinguished men as Lavoisier, the
ist, and Benjamin Franklin, then repre-
ıg the new American republic in Paris.
of the tests were made in Franklin's gar-
it was shown that patients went to the
g tree and had their convulsions, if they
ded it as the tree which the magnetizer
of Mesmer's pupils) had magnetized.
such experiments ingeniously varied, the
ıission concluded that the actual effect
lue to a stimulated imagination, and that
was not a vestige of proof that the al-
fluid or the other fanciful procedures had
existence or significance other than the
al one. The report counteracted Mes-
growing notoriety, but led to many con-
rsies, medical men taking issue for and
ıst him, while the French Revolution put
ıd to Mesmer's Parisian career.

ough hypnotism grew out of the interest
ıimal magnetism, Mesmer had no part in
liscovery of hypnosis; his attachment to
nal magnetism" blinded him to the signifi-
e of what was actually going on. It was
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the Marquis de Puysegur—one of Mesmer's pupils—who observed that one of the magnetised subjects could hear only what the magnetizer said, was oblivious to all else, and when awakened had forgotten all that happened while under the influence. He called this condition *artificial somnambulism.* He observed, further, that the subject would execute commands while in this condition, would answer questions, and seemed more intelligent. The condition was no sooner recognized than a false direction was given to the important discovery. The somnambules were used to prescribe in the trance for their fellow patients; they were credited with a second sight; they were supposed to see directly into the condition of the internal organs, and thus diagnosed, prescribed and predicted the issue of the treatment. Under such encouragement somnambules were used for public exhibitions and read sealed messages, saw through sheets of paper, read fine print, suffered needles to enter the skin, etc. With this period of the discovery of hypnosis should be associated the use of the state as an anesthetic; for severe operations were performed upon patients in this condition (this was before the discovery of ether) in France, England and India, and thus proved the genuineness of the condition.

The religious, the magnetic and other magical procedures represent the first stage; while "artificial somnambulism" represents the second stage of hypnotism. The third was inaugurated by James Braid (in the period 1840-1850), who recognized the trance-state as genuine and abnormal. He at once dismissed the notion of any fluid or physical force and also the notion that any peculiar power resided in the operator. Everything was referred to the susceptible nervous disposition of the subject under the influence of an exalted suggestibility. It was most unfortunate that Braid added to the bad reputation of "mesmerism" (which interfered with its recognition by the medical profession) by using the hypnotic state—to which Braid gave the present name—to demonstrate the reality of the phrenological functions (see PHRENOLOGY). Thus Mesmer was convinced of the fluid, Puysegur of the second sight of his somnambules, and Braid (for a time) of the reality of the phrenological locations, by the suggestibility of the subjects, who shrewdly enacted the results which the theories of the hypnotizers expected.

The fourth stage in the recognition of hypnotism began about 1870 through the work of

Charcot, Liebault, Bernheim and others in France, and led to the recognition of *suggestion* (which see) as the decisive clue to the phenomena. It was completed by the recognition that suggestibility was but a symptom, and that the dissociated state of the hypnotized patient was the essential factor.

What is altered in hypnosis is the manner of report and control of sensations and movements; what is seen, heard, felt and done is referred to a restricted type of consciousness dissociated from the normal, complete variety. As the sleepwalker sees enough to guide his footsteps, but is oblivious to the presence of those who may be observing him, so the hypnotized subject responds to the suggestion of the operator, both positively and negatively. If told that a lion has entered the room, he will see the hallucinated lion; or if a chair be pointed to as a lion, it will become one. If told that the chair has vanished, he no longer sees it. The scene may be dramatically enacted with fear, hiding, shouting or attack. It was this unlimited possibility of control of actions by the operator that was utilized in the performance of traveling hypnotists; their subjects were put through ridiculous and straining performances; the suggestion of a scene was given, and the performers continued the action according to their experience and capacity. In all this there was little enlightenment beyond proof of the readiness with which the state could be induced in susceptible persons and the variety of suggestions which could be imposed.

By systematic study it was found that within the limited field the senses were spontaneously, or could be rendered unusually, acute; faint sounds could be heard, fine print read, discriminations of touch and temperature made beyond ordinary capacity. Motor control was similarly involved. Actions beyond ordinary strength were performed; similarly, by suggestion, paralysis could be induced, partial or complete. Actual sensations were suggested away, and the sense of pain and strain disappeared. Ordinarily upon a return to the waking condition, there was no recollection of what had taken place. Very striking were the post-hypnotic suggestions; it might be suggested that after a specified interval after awakening the subject would fetch an umbrella and open it, or write a card, or ask a question. At the proper time the subject becomes restless and seems impelled to perform the prescribed action, though then quite conscious of the impulse which he cannot resist.

No brief summary of the variety of hypnotic behavior is possible. The essential fact is the state of dissociation. A part of sensation, movement and mental action proceeds in isolation from the rest; what is retained and what is lost, what powers are exalted and what reduced, depends upon the nature of the contracted and dissociated field, as it arises from within the subject or is imposed from without by suggestion. What is in abeyance is the normal sway of consciousness and control which would set up a resistance to the imposed suggestion, recognize the unreality of the delusion, break the spell of the imposed control. Why certain persons should be susceptible to such dissociation is not readily determined; it is a part of nervous liability, as is proven by the established connection between the extreme hypnotic suggestibility and the hysterical condition.

Selecting from the mass of data the more essential facts, we may note first the anesthesia, which shows how completely the normal channels of sensation may be blocked, for the most serious operations have been performed in the hypnotic condition; we note the use of hypnosis to cure hysterical incapacity and such states as insomnia; we note that hypnosis acts as a clue to natural states of dissociation and secures lost power of control by removing mental obstructions; and we note that the dissociation is never complete, which means that there is some sort of intercourse between the functions as exercised and the normal relation. All of these results are valuable in theory and practice. They give an entirely different value to the hypnotic state and require a technical knowledge for their interpretation and their wise application.

Hypnotism is not a toy for amusement; and public exhibitions have been largely condemned. It is an instrument in the hands of psychologists for the analysis of complex mental states and in the hands of physicians for rectifying nervous disabilities and restoring mental adjustment. It is readily open to abuse and is only one of several methods to be employed with care and discretion. Its history is interesting and in no respect more so than the light which it throws upon suggestibility and the shrewdness with which the hypnotic subject displays the results expected of him.

A few words upon hypnotic susceptibility and the mode of hypnotising may be added. The state (of dissociation) is one of degree, and falls into lighter and deeper stages. Sta-

are variable, according as they make this ction; but it is safe to say that ten to y per cent of persons may be induced or d to enter a form of hypnotic trance; far higher percentages of success are given ench observers. Braid used intense fixa- of the eyes at near range (staring at a ball), together with a powerful command passive acceptance of a sleeplike "going- Once the state has been induced, mere tation, word of command, as "Sleep," or eed signal is sufficient to induce the state. cts may in part or whole hypnotize them- ; this is called autohypnosis. They are d to consciousness by a sharp command, ake up" or "All right;" though the diffi- of awakening is one of the many reasons he practice in amateur hands is a dan- s one. The susceptibility to the state can- e regarded as in itself a sign of nervous ility; for vigorous and nervously-sturdy s may succumb. Yet in general and eference to the extreme and deeper forms pnosis the relation to nervousness is es- ed.

ile at one time great expectations were d of the curative value of the procedure, hile unquestionably it forms an impor- id in medical hands to break up stubborn us resistance, it is now conceded that hyp- is but one of several methods of mental eutics. Hypnoid states in which the sub- emains more nearly awake and renounces f his personality are induced by some ians; the same mechanism of suggestion basis of the treatment. In the main the of hypnosis lies in restoring functions have lapsed from normal relations. Its e should be limited to physicians and ologists who are conversant with its na- nd dangers. The question whether a tized person may be induced to commit e is not simply answered; but that an- n the main is affirmative, since moral re- es may be overcome, and the hypnotized be substantially in an irresponsible, be- oversuggestible, condition. The law has recognize this possibility.

sult Jastrow's *Fact and Fable in Psychol-* rince's *The Unconscious*

ated to Various Beliefs. The articles on lowing topics, while not bearing on hypno- re of interest in this connection.

ny	Demonology
ogy	Divination
oyance	Faith Cure
ring	Magic
Medium	Psycho-Analysis
Mesmerism	Spiritualism
Mind Reading	Suggestion
Necromancy	Superstition
Occult	Telepathy
Palmistry	Theosophy
Phrenology	Trance
Physiognomy	Witchcraft
Psychical Research	

HYPODERMIC INJECTION, *hi po der' mik in jek' shun,* a method of forcing medicine beneath the skin by means of a small glass syringe, so it can enter the blood directly when quick results are necessary, or when the stomach is in such a condition that it cannot retain drugs. The term *hypodermic* is derived from two Greek words meaning *under* and *skin.* The medicine may be injected just beneath the skin, or the point of the syringe may be thrust into the body of a muscle, but care must be taken not to wound the blood vessels or nerves. It is customary to make a special preparation of the drug which is to be introduced, but only a physician or trained nurse should undertake to administer the treatment, and all instruments used must be sterilized. For the use of the hypodermic injection in producing insensibility to pain, see ANESTHETIC.

HYSSOP, *hiss' up,* a plant of the mint family which, although a native of Southern Europe, has been cultivated extensively in the warmer sections of the United States for its medicinal properties and for its seeds, which are used to season salads and soups. It is a bushy plant, which grows about one and one-half feet high; it has a square, coarse stem, with little stiff, pointed leaves. The tiny blue flowers grow in clusters so close to the stem that they are inconspicuous.

HYSTERIA, *hiss te' ri a,* a diseased state of the nervous system which causes a person to manifest intense excitement and emotion or, in more severe cases, even to have convulsive attacks. Uncontrollable laughter and sobbing and violent screaming are common in some attacks of hysteria. Among the causes of this ailment heredity plays a very important part, for parents having epilepsy, insanity or other nervous diseases are very liable to bequeath to their children a tendency to hysteria; overwork, worry, mental shock or injury to the nerves from an accident will also often cause attacks of the disease. In minor cases rest will work a cure in a short time, but tonics and nutritious diet, together with a change of environment and relief from worry, are needed to help the victims of severe attacks. W.A.B.

Ii

I, the ninth letter in the English alphabet and in all others derived from the Phoenician. The name in the latter language was *yod,* which meant *hand,* and some scholars have held that in its original form, which was somewhat like a tall, narrow *Z,* the letter was a rude sketch of a hand, bent at wrist and knuckles. Like all other letters in the Phoenician alphabet, *yod* was a consonant, but approached a vowel sound; and the Greeks, when they took it over, made of it a vowel with the *e* sound. They also straightened it out into its present form. In Latin the letter kept the same sound as in Greek, but the Romans perceived that in certain words, as in the name *Iulius,* it had really the force of a consonant, and later writers adopted a slightly different form for the letter in its consonant use. From this modified *I* came the modern *J.*

The vowel *i* has four main sounds. Long *i,* as it is called, is the sound heard in the word *ice.* It is in reality a diphthong, rather than a single sound, for it is made up of the sound of *a* in *father* and of *i* in *it.* The two are so closely blended, however, that the combination is a difficult one for many foreigners to acquire. Short *i* is heard in *stick;* and the other common sound is that found in *first.* The fourth sound is that which is most common in all languages of the Continent but very uncommon in English words, except those adopted from foreign languages—the one heard in *machine.* In its consonant value, *i* is found in such words as *genius.*

The Hebrew letter which corresponded to the Phoenician *yod* bore the same name, and as it was the smallest of all the letters its name came to be use figuratively to denote anything very small. The English word *jot* is derived from it.

IBERIA, *i be'ri a,* the ancient name of the peninsula now comprising Spain and Portugal. The Iberians, probably the most ancient of all European races, inhabited the regions watered by the river Iberus, now called the Ebro. The Basques are direct descendants of the Iberians, whose language they retain in part, and the population of Italy, Spain and Portugal contains a large admixture of Iberian blood. The race was characterized by long heads and short stature. It spread over large areas of Europe and even as far north as Scotland, the Picts having been identified as of Iberian descent. The term *Iberia* is still frequently used with reference to Spain and Portugal, especially in literature, the expression *Iberian peninsula* being quite common.

IBERVILLE, *e ber veel',* PIERRE LE MOYNE, Sieur d' (1661-1706), a French-Canadian soldier, naval commander, explorer and founder of the province of Louisiana, which became the American state of the same name. In 1698 he sailed with two ships from France to found a colony at the mouth of the Mississippi River, as La Salle had attempted to do, and in 1699 entered Mobile Bay. Leaving his fleet, he set off with a party in small boats in search of the great river. He went up the Mississippi until he came to an Indian village, where the chief gave him a letter which Tonty, thirteen years before, when in search of La Salle, had written and left in the crotch of a tree. Thus he knew he was on the Mississippi. But, seeing no spot there available for the site of a city, he led his colony to Biloxi Bay and founded Biloxi, afterwards called Mobile, thus fulfilling La Salle's dream of founding a French colony on the Gulf of Mexico (see LOUISIANA, subhead *History*). See, also, LA SALLE, RENÉ-ROBERT; TONTY, HENRY DE.

IBEX, *i'beks,* the name given to several species of wild goats, called *steenbock* by the Germans and *bouquetin* by the French. The most familiar species formerly inhabited the mountainous regions of Central Europe, but has

THE IBEX

now become very rare. The horns of this ibex are long and flattened, and in the European species attain a length of forty inches. The Himalayan ibex is the largest of the species. It stands about forty inches high at the shoulder, and its horns are often more than fifty inches long, with a circumference of twelve inches at the base. Hunting the ibex is a favorite sport of natives of India. This is attended with great danger, owing to the rugged nature of the haunts of the animal and its amazing agility in climbing and descending precipices. In Central Asia the ibex roams in herds, sometimes numbering 100 or more. Although constantly hunted, it is so prolific that no decrease in numbers seems to have occurred there. As a trophy the head and horns of the animal are highly valued by sportsmen.

IBIS, *i'bis,* a storklike wading bird, closely related to the curlew. It has a long, slender bill with a downward curve, long legs and a long neck usually almost bare of feathers. The *sacred ibis* of Egypt is about two and one-half feet in length and has black and white plumage. It was worshiped by the ancient Egyptians and embalmed after death. The *scarlet ibis* has red plumage, the wing feathers being marked with a black stripe. The *white ibis* is common in the southern portions of the United States, but is seldom seen farther north than South Carolina. The ibis is a sociable bird and gen-

THE IBIS

At the left is the white-faced, glossy ibis; at the right, the bird which was the sacred ibis of Egypt.

erally lives in colonies, as many as forty pairs sometimes nesting in the same tree.

IB'SEN, HENRIK (1828-1906), a Norwegian dramatist, one of the most famous writers of his century. The titles of his works are household words in all advanced countries, for translations have appeared in many languages. His dramas, partly in prose and partly in verse, embody the spirit of modern times, and it is through his masterful presentation and treatment of many of the social problems of his age that he attained to supreme eminence and authority in the modern drama. He was an apostle of individual freedom, a firm believer in the glory of work, and dreamed of the reorganization of society through the good influence of women.

IBSEN

Brand and *Peer Gynt* are his two best dramatic poems. The former is an arraignment of the half-hearted pietism of many of the Norwegian people; the latter tells the story of the devoted love of an unselfish woman for a faithless, unscrupulous man. *Peer Gynt,* in a dramatized version, has met with great favor on the stage. It was one of Richard Mansfield's most popular productions. His first prose

drama, *The League of Youth,* hits at political parties of Norway and is a travesty on the religious shamming of the day. His *Pillars of Society, A Doll's House* and *Ghosts* were forerunners of the great woman's movement which characterized the close of the nineteenth century. In *An Enemy of the People,* Ibsen appears as an aggressive social reformer, and with satire as a weapon he wages war with a world out of joint. *The Wild Duck* is an attempt to arouse in the individual ideals for which Nature never intended him. In *Rosmersholm,* Ibsen turns from an arraignment of society in general to a study of the struggles of the individual toward the light. *Hedda Gabler* is a portrait play of a worthless, idle woman. *The Master Builder* brings a message of encouragement to the great army of workers of the world who earnestly and honestly strive. *Little Eyolf* is a tragedy of a guilty conscience. *John Gabriel Borkman* is the story of a defaulting bank manager. *When We Dead Awaken* reveals the tragedy of the discovery that life's best gifts have been wasted in the pursuit of something false and showy rather than for something of enduring reality.

Ibsen's own life story holds little of interest. He was born at Skein, in South Norway, and was successively director of the theater at Bergen and the Norske Theater at Christiania. In 1864 he left his native country, lived for several years in Rome and Dresden, but returned to Norway in 1878. Ibsen's efforts have been directed toward the highest and best in life. In his social dramas he gave the people of his generation not what they wanted, but what they needed. R.D.M.

Consult Jaeger's *Henrik Ibsen: A Critical Biography;* Rose's *Ibsen: Poet, Mystic and Dramatist.*

ICE, whether in natural form or artificially produced, has become one of the most useful commodities that civilized man has appropriated for his own needs. This substance, which keeps the butter, cream and fruit in the household refrigerator fresh, sweet and appetizing in the warmest summer weather, is water reduced to solid form through the process of freezing. A block of ice is a collection of minute crystals, but these are not usually discerned because they are so regularly arranged and so compactly united. If we should subject a piece of ice to the effects of heat, and then examine it with a lens, we would see in the interior numerous tiny six-sided (hexagonal) crystals that under the continued influence of heat would expand into beautiful six-rayed stars. The crystals that are so plainly seen in snowflakes are of the same form.

Under ordinary conditions pure water freezes at a temperature designated as 32° on the Fahrenheit scale, and as 0° on the Centigrade scale, but ice may form at other temperatures than this. The freezing point is lowered when great pressure is applied to the surface of water, and usually the presence of impurities has a similar effect. Sea water, for instance, which contains salt in solution, freezes at a lower temperature than fresh water (about 27° F.). It is an interesting fact that while nearly all substances are heavier in solid form than in the liquid state, ordinary ice is lighter than water and will float in it. This is due to the fact that as it approaches the freezing point water begins to expand, and when it freezes, it expands so as to increase its volume about one-ninth. This expansive force is sufficiently strong to break glass and earthen pitchers and to split open great rocks in the crevices of which water has frozen.

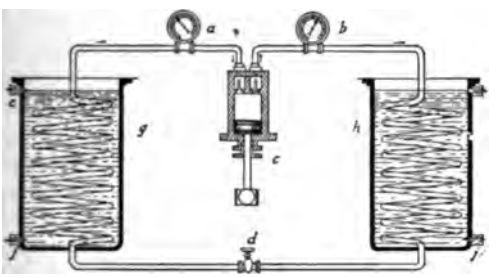
The Ice Industry. The harvesting, storing, manufacture and transportation of ice constitute an important industry, which has developed proportionately as ice has come into general use for preserving foods and other perishable substances. This industry is divided into two main branches, one connected with the harvesting and distribution of natural ice, and the other with the production of artificial ice.

Natural Ice, as its name implies, is cut in the winter time from ponds, rivers and lakes. As a preliminary step in the process of harvesting, the snow and whatever debris may lie on the surface of the field are cleared off by means of scrapers, and if there is an additional layer of snow ice this is also removed. The next step is to outline on the ice area the blocks into which it is to be cut. This is done by a machine called a *marker,* which is usually drawn by mules or by horses. This machine first cuts on the surface of the field a series of parallel grooves about three feet apart, and then outlines a second series the same distance apart, which cross the first at right angles. The marker is followed by a plow whose cutting apparatus consists of a steel bar equipped with a set of sharp knives, one behind the other. The plow cuts the grooves deeper, so they extend nearly through the ice, and it is then an easy matter to pry the cakes loose and float them to shore through channels provided for the purpose. The cakes are run into the ice houses on elevators or inclined

planes; there they are packed in sawdust or other material and kept in storage until needed. The average cost of harvesting a ton of natural ice is about eighty cents.

Natural ice is harvested in the United States and Canadian provinces on an enormous scale. The industry in the former country dates from the early part of the nineteenth century, the two most important fields of operation being in Maine and on the Hudson River. There are also huge ice houses on the lakes and streams of Wisconsin, Minnesota and Michigan, some of which are nearly 300 feet long and five stories high. The total capacity of the buildings used for storing natural ice throughout the country is about 30,000,000 tons.

Artificial Ice. The trouble and expense attending the transportation of natural ice long distances and the changeable weather conditions have resulted in the rapid development of the artificial-ice business in those sections far removed from natural ice fields. The first important ice factory established in America was erected at New Orleans in 1866, and at the present time the people of the Southern states depend almost entirely upon the manufactured article for their supply of ice. The Middle states also produce great quantities. Natural ice enters into successful competition with artificial ice farther north; the states of Maine, New Hampshire, Minnesota, North Dakota, South Dakota, Montana and Wyoming reported no ice factories to the Thirteenth Census (1910), while the latest Canadian census (1911) lists only four of such establishments. However, manufactured ice is gradually making its way into the northern territory, and its use is continually increasing. According to a recent estimate, there are 3,500 ice factories in the United States, with a yearly output of 18,000,000 tons, valued at $45,000,000. These establishments, which do not include the numerous private plants operated by breweries, cold storage houses, etc., represent an investment of about $150,000,000.



HOW AN ICE-MAKING MACHINE IS CONSTRUCTED

(*a*) Low pressure gauge	(*e*) Brine inlet
(*b*) High pressure gauge	(*f*) Brine outlet
(*c*) Compressor	(*g*) Evaporator
(*d*) Regulating valve	(*h*) Condenser
	(*i*) Water outlet
	(*j*) Water inlet

The manufacture of ice is a practical application of the principle that when a liquid changes to a vapor or gas heat is drawn from surrounding objects and their temperature is reduced. Ammonia, because of its cheapness and the low temperature at which it is converted into a gas, is the liquid most commonly used as a refrigerating agent in ice factories and cold-storage plants. Ammonia gas is condensed into a liquid by means of a powerful force pump which is driven by steam. The resulting liquid, which contains no water and is known as *anhydrous ammonia,* is then sent through a valve into a system of pipes from which the air has been pumped, and which pass back and forth in a large tank containing salt water, or brine. In these pipes the ammonia expands into a gas, the heat required for the process being absorbed from the brine. The latter, though it does not freeze, is cooled until its temperature is several degrees below the freezing point of fresh water.

The water which is to be frozen is placed in cans the shape and size of the desired blocks of ice, and these are kept submerged in the cold brine until their contents have frozen solid. After the freezing process the cans are raised from the tank by a hoist and then dipped into warm water to loosen the cakes of ice within them. The above operations require from twenty to sixty-six hours, the time varying with the size of the blocks of ice and the temperature of the brine.

Considering all seasons of the year, it costs from $1.10 to $1.50 to produce a ton of artificial ice; wholesale prices range from $2.00 to $2.25 per ton, and the retailer pays from fifteen to forty cents per hundred pounds, according to the season and locality. In large cities coupon books good for 1,000 pounds of ice are sold to consumers, the cost of such books being from $2.50 to $3.00 each. B.M.W.

Related Subjects. For material of interest in connection with this subject, the reader is referred to the following articles:

Ammonia	Iceberg
Cold Storage	Snow
Expansion	Thermometer
Freezing	

ICE'BERG. The deadliest perils that ships have to face, especially in the North Atlantic

Ocean, are fogs and icebergs. One of the greatest marine disasters in the history of the world, the sinking of the *Titanic* on the night of April 15, 1912, when over 1,600 human beings lost their lives, was caused by icebergs. The *Titanic* was at that time the largest ship afloat, and was on its first trip from Liverpool to New York.

AN ICEBERG
Drawn to the average scale.

How They Are Formed. Icebergs are huge masses of ice which are detached from land glaciers. Those in the North Atlantic come from Greenland. That great island is largely covered with a huge sheet of solid ice that attains in places more than a mile in thickness. The numerous glaciers on its surface move slowly towards the sea, and there portions become detached from them through the action of the sea and through their own weight. Most of the icebergs are formed on the west coast of Greenland, but a great number also descend from the east coast. After the icebergs are detached they drift across Baffin Bay and Davis Strait to the coast of Labrador. There some of them are caught by the Labrador Current, which flows south, and are carried into the Atlantic Ocean by way of the Newfoundland Banks.

Description. Icebergs are of varying size, shape and contour, and present the strangest and most picturesque forms. Some of them are of gigantic size and weigh millions of tons. They are sometimes miles in length and rise to heights of about 250 to 300 feet above the surface of the sea, but the portion above the water is only about one-eighth of its whole mass. Icebergs consist of clear, compact, solid ice, with a bluish-green tint, and as explained above, they are formed of fresh water, not of sea water. They reach the routes of the transatlantic liners in greatest numbers in April, May and June, but they are sometimes met earlier, and even later. That is the reason why ships crossing the Atlantic follow a more southern route during these months.

The southern limit of icebergs extends from about latitude 60°, southeast of Iceland, and follows a southwesterly direction until it reaches to the south of the Newfoundland Banks. The section of the Atlantic Ocean where they are most frequently met is between 41° to 43° latitude and 47° to 50° longitude. The disaster of the *Titanic* occurred at 41° 46′ latitude and 50° 14′ longitude. When the icebergs reach farther south they begin to melt, owing to the sunshine and to the action of the warmer water of the ocean. They disappear altogether about 400 miles south of Newfoundland.

Ice Fields. Icebergs often travel in company and form large ice fields sometimes hundreds of square miles in extent. While some of them show on the surface of the water, others are running almost entirely submerged. The thermometer often reveals the presence of an ice field, for its immense frozen mass chills the air and the water, and a sudden lowering of the temperature may warn the captain of a vessel of the approaching peril. Man has no power to destroy an iceberg; it cannot be blown up, it cannot be steered away into another course, it cannot even be approached with safety. The only way to avoid its perils is to keep out of the region where an ice field is known to exist.

Icebergs similar to those in the North Atlantic are also found in the south polar regions.

ICE BOATING. See Ice Yachting.

ICE'LAND, one of the most northerly of all inhabited lands, an island which lies immediately south of the polar regions. The Arctic Circle touches it at its farthest north extensions. That few places are too inhospitable, too barren and too rigorous for white men to choose as home is shown by the fact that Iceland has been inhabited by Europeans and their descendants ever since its discovery, over a thousand years ago. Its population is sparse, however, for with an area of about 40,000 square miles, only one-ninth less than that of Pennsylvania, it has 85,000 inhabitants, or about one-ninetieth as many as the Keystone state. Iceland has a length of about 300 miles

LOCATION MAP

and a breadth of almost 200 miles; in form it is roughly oval. In the northwest, however, a peninsula, as craggy and as much indented by fiords as the coast of Norway, juts out into the sea.

The People. The Norwegians settled Iceland, and their descendants, the Icelanders of to-day have many of the qualities of the Norsemen, being sturdy, thrifty and intelligent. They have developed sturdiness in combating the none too favorable climate, but this sturdiness alone has not enabled them to keep their death rate down, and until recently a distressingly large percentage of the babies died. Better sanitary conditions, however, and more doctors have improved conditions, and the population is increasing steadily. Thrift, too, is a natural outgrowth of living conditions in a land where hard work is necessary if life is to be sustained. The intelligence of the Icelanders is proved by the value they place on education and by their fondness for reading. Perhaps they remember that long ago, when countries which are to-day among the foremost in Europe had scarce begun to produce a literature, Iceland had its poets who wrote epics which to-day the world is glad to study. At any rate, the children in Iceland must be taught to read and write and figure, and teachers travel about from farm to farm. Schools are few, but this is because so few of the people live in towns. The Lutheran Church, to which the people almost without exception belong, has a large part in the educational scheme, and many of the teachers are also the preachers.

The traveler in Iceland sees many odd-looking little iron houses, for wood is scarce, and many islanders send to Birmingham, England, for their "portable" dwellings. Another thing which cannot fail to attract attention is the entire absence of public houses or barrooms, for Iceland has been since 1908 a prohibition country.

What the People Do. The inhabitants live mostly in the lowlands along the south and southwest coast, where the climate is not so harsh; but even here there is not enough warmth for the raising of many crops, for the average summer temperature of 48° is but sixteen degrees above the average winter temperature. But although wheat will not grow, grass is fairly abundant, and the raising of cattle, sheep and horses is the chief industry. Agricultural schools have been founded, and certain quick-growing vegetables do well in sheltered locations.

There can be no lumbering, for the only trees, the birch and the mountain oak, do not grow large enough to be of any use, and there are no manufactures. There are no minerals, except sulphur, of any particular value. But there are fish of all kinds, and the hardy Icelandic fisherman puts to sea in his little open boat in all sorts of weather. The man who could write truly the lives of these fisherfolk beside their stormy seas would have tales of daring and of heroism unsurpassed anywhere. The fish are sent, after drying, to Denmark and to Scotland, along with sheep and horses, wool and hides; for steamers call at the island every three weeks. It is an interesting fact that, with the outbreak of the War of the Nations in 1914, Iceland had to seek elsewhere for the supplies obtained in normal times from Scotland and Denmark, and that in October of that year there sailed from the United States the first freight-boat that ever went from that country direct to Iceland.

The Land. Interesting as the people are, the country is no less so. "The land of ice and fire," it has been called, in reference to its ice caps and its volcanoes, its glaciers and its geysers. The whole island has been built up by the outpourings of volcanoes, and the central plateau is still a wilderness of lava beds and deserts, with almost innumerable craters rising above the surface. At least a hundred volcanoes still show signs of life, and as is usual in volcanic lands, hot springs, bubbling mud lakes and spouting geysers abound. Not far from Hekla, the most famous of the volcanoes, is the Great Geyser, which hurls its immense columns of almost boiling water to a height of over 150 feet. In this land where snow falls the year round there is found, also, the hottest spring in the world—a spring whose waters below the surface are fifty degrees above the boiling point. And here, there and everywhere are the ice fields—"dead" glaciers which no longer have a true glacier flow. Thus this region, in part so inhospitable that it will not support life, is a land of magnificent scenery, which can offer in addition to its beauties a summer climate delightfully cool, and days which almost literally have no night.

Government and History. Iceland belongs to Denmark, but the island has had home rule and a liberal constitution since 1874. There is a legislative body, known as the *althing*, of forty members, all but six of whom are chosen by popular vote; the governor-general, who is appointed by the king, is responsible to that

body for his acts. Women vote on equal terms with men, and there are no property qualifications. The capital and only town of importance is Reykjavik, which has about 12,000 inhabitants.

Discovered in 870 by the Norwegians, Iceland was speedily settled, for the severe climate was easier to bear than the severe rule of the Norwegian king, and by 930 a sort of republic had been established which was not dissolved for about four centuries. In the year 1000 Christianity was introduced, and from that time growth in civilization was steady. A really remarkable literature developed in the twelfth and thirteenth centuries, partly as a result of the isolation of the island and its rigorous climate; for during the long winter the people found their chief delight in listening to stories, and it was those hero-tales which were worked up into the classics of the language.

All this time Iceland had been independent, but in 1262 it became united with Norway, and eighteen years later passed with the latter country under the sway of Denmark. The outstanding events in the centuries that followed centered about natural forces rather than political contacts. Volcanic eruptions were frequent, and were almost always followed by floods from the glaciers which the hot lava had melted. Of all these eruptions, the most disastrous was that of Laki, in 1783, by which one-fifth of the inhabitants were killed. There were earthquakes, too, and famine; cholera and the black death, the latter carrying off in two dread years about two-thirds of the population.

Within these troubled years the Reformation was introduced into Iceland and spread rapidly. England captured the island during the Napoleonic wars, but surrendered it to Denmark in 1815, and its political status has not changed since. The granting of home rule in 1874 came as the result of an agitation long-continued but not violent, and Iceland has shown itself well able to use its privileges. There is no more law-abiding group of citizens in the world, probably, than the Icelanders. It is said there is not a jail on the island. A.MC C

Consult Maccoll's *The Story of Iceland;* Leith's *Iceland.*

Related Subjects. The reader who is interested in Iceland is referred for related material to the following articles in these volumes:

Edda	Northmen
Flord	Reykjavik
Geyser	Sagas
Hekla	Volcano

ICELAND MOSS, a species of lichen that grows in abundance in Iceland and on the mountains of many northern countries, such as Scotland and Norway. It grows to a height of about one and one-half to four inches, and on

TWO VARIETIES OF ICELAND MOSS

account of its erect growth has the appearance of a moss. The plant is used in Iceland as a food, being either dried and beaten into a powder, from which bread is made, or boiled with water and milk until it is transformed into a jelly. Iceland moss is used in industry for dressing the warp in weaving, and also in the manufacture of paper. See LICHENS.

ICELAND SPAR, the mineral through which we can see double, that is, through which we can see two objects where there is only one. Iceland spar is a variety of calcite (which see), which forms in perfect transparent crystals, the latter being in the form of a rhombus. It takes its name from the fact that it is found in Iceland. When one of the crystals of Iceland spar is placed over a dot or a line two dots or two lines are seen, the peculiarity being due to double refraction of light. See POLARIZATION OF LIGHT, for illustration of the phenomenon above explained.

ICE YACHTING, *yot'ing,* a sport of distinctly American origin, and still almost entirely confined to the United States and Canada. Russia has in a slight measure adopted it, but in no other country has it ever reached the position of a regular winter pastime. The original ice yacht consisted merely of a square box with an ordinary skate on each side and one at the back to serve as a rudder; but speedy yachts consisting of a long beam or body with a crossbar, and a spread of sail capable of producing a speed of seventy miles an hour and more, have been developed. At each end of the crossbar a skate is fastened, and another is used as a rudder, being attached to the lengthwise bar or body of the craft. The box for the passengers may be elliptical or

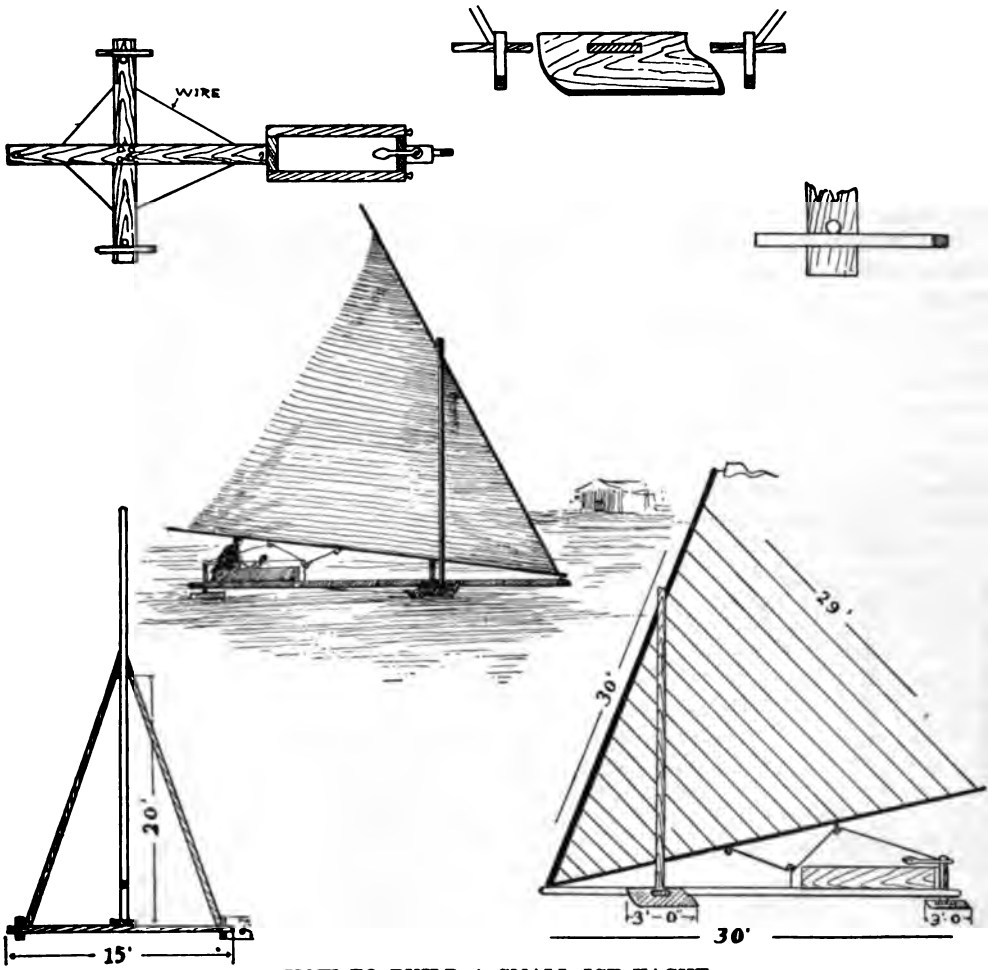
AN ICE YACHT

A two-masted vessel such as is pictured here can exceed the speed of a fast express train.

triangular, and of whatever size is convenient. The mast is usually placed at the junction of the crossbar and the body of the yacht, or a little in front of the crossbar. A second mast is often added at the stern.

Ice yacht races form important winter events. The course is always triangular, usually with a distance of one mile for each side of the triangle. Contestants must sail a given number of times round the course in each heat. W.C.

ICHNEUMON, *ik nu' mon,* the name applied to a number of small, weasel-shaped, flesh-eating animals of the civet family. The name is from the Greek, translated liberally to mean *to track* or *hunt out,* referring originally to its habit of seeking after the eggs of crocodiles. The best-known species is found in Egypt,



HOW TO BUILD A SMALL ICE YACHT

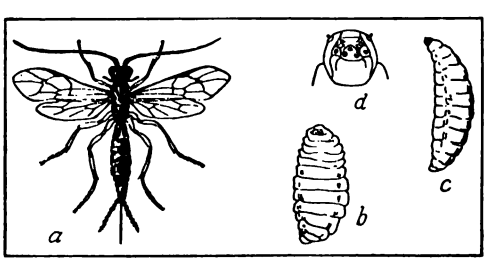
Details of construction are shown with sufficient clearness to enable any skilful boy to construct a serviceable yacht. When completed it should have the appearance of the boat in the middle picture.

where foreign residents call it *Pharaoh's rat.* It is covered with long, wiry fur of a grayish-yellow color, and has black feet, tail and muzzle. It feeds on rats and mice, birds and reptiles, and is partial to poultry and their eggs. It was highly esteemed by the Egyptians because of its enterprise in the destruction of the eggs of crocodiles. During the overflow of the Nile it sometimes enters the homes of man, but it usually limits its wanderings to the fields and river banks. The Indian ichneumon, or *mongoose,* is smaller than the African species and has pale-gray fur. It performs invaluable service in its native land as a serpent-killer, attacking and destroying all sizes of reptiles with the greatest ferocity. See MONGOOSE.

THE ICHNEUMON

ICHNEUMON FLY, one of a great order of insects called *hymenoptera,* or membrane-winged, the name *ichneumon* being derived from that of an Egyptian animal known as the *ichneumon,* or *Pharaoh's rat,* which devoured the eggs and young of the crocodile. The word *ichneumon* is from Greek words meaning *the tracker,* from the habit of the animal just named to seek its food in crocodiles' nests.

These flies are parasitic and feed upon other insects which destroy vegetation, caterpillars being especially subject to their attacks. In appearance they vary in size, but all are shiny-black in color, with a wing spread of about three-fourths of an inch and a body half an inch long. They deposit their eggs by means of a special pointed *ovipositor,* or *egg-depositor,* either in or on the bodies or larvae of other insects. The eggs hatch quickly, and the grub feeds upon the body of the host insect, becoming full-grown in four days, during midsummer. On the whole, ichneumon flies are beneficial insects, as they prevent great damage to shade trees as well as to agricultural crops, by destroying the tussock moth and the army worm, which are special pests of the farmer.



ICHNEUMON FLY
(*a*) The adult fly
(*b, c*) Back and side view of larva
(*d*) Head of larva

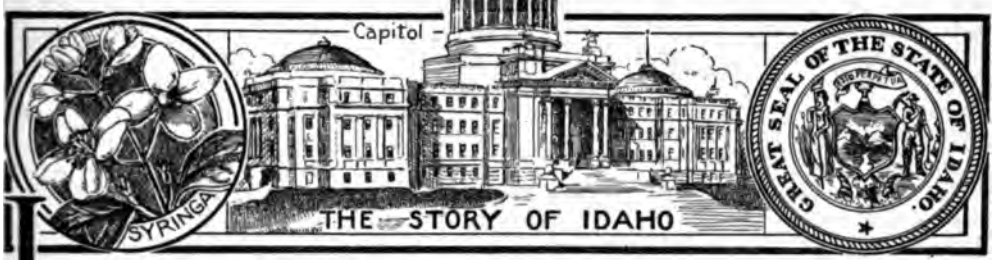
ICHTHYOSAURUS, *ik thi o sawr' us,* a word derived from two Greek words meaning *fish* and *lizard,* and now applied by scientists to the fossil remains of certain marine reptiles. They had round tapering bodies, large heads, long, powerful tails, and crude feet resembling paddles. It is evident from remains found in England and Europe that they once existed in vast numbers. In size they varied greatly, some being over forty feet in length, while fossilized specimens only four feet long have been found. Their food consisted of fish. About thirty-five different species have been discovered as fossils in widely-distributed parts of the globe. They were apparently most numerous on the south coast of England and parts of the coast of Germany, but remains have been found in South America, Australia, New Zealand and the East Indies.

SUPPOSED FORM OF THE ICHTHYOSAURUS

ICONOCLASTS, *i kon' o klasts,* a word derived from the Greek *eikon,* meaning *image,* and *klan,* meaning *to break,* hence applied to the image breakers in the days of the early Christian Church. There had long been a dispute dividing the Church concerning the images of Christ and the saints which were placed in all churches. In the eighth century the dispute came to a climax. In 726 Leo III issued an edict condemning the worship of images and the burning of incense in their honor. Many images were destroyed, and the

Church was divided into factions. The Iconoclasts, as those objecting to the presence of images in churches were called, persecuted the image worshipers, who retaliated whenever possible.

A council held in Constantinople in 764 condemned image worship. The second council of Nicaea defined a doctrine, asserting that the images were not worshiped but were venerated for what they represented. The controversy lasted for a century. In 842 a council at Constantinople declared in favor of image worship. Martin Luther regarded the question of images in churches as one of little importance, though bitterly opposing all forms and ceremonies that showed any tendency towards their worship or to idolatry. In the Greek Orthodox and Roman Catholic Churches images are still retained and venerated as symbols. In Russia sacred pictures called *eikons* are placed in all churches and are taken with the armies into battle, but they are not actually worshiped..



IDAHO, *i'da ho,* a northwestern state of the American Union and the northernmost of the Rocky Mountain states. Its name is derived from a Shoshone Indian word which means *the Gem of the Mountains,* and refers undoubtedly to the brightness of the shining sun on the mountain tops of this rugged state. Idaho is as yet a thinly-settled region, but it is among the only three states of the Union which showed an increase of population of over 100 per cent in the decade from 1900 to 1910. Only two states showed larger increases in the same period, namely Washington and Oklahoma. As its flower Idaho has chosen the syringa, popularly known as the mock-orange.

Size and Location. In size Idaho ranks twelfth among the states of the Union. It has an area of 83,888 square miles; this makes it about twice the size of Ohio, and about one-quarter the size of British Columbia, its neighbor across the international boundary. Idaho is irregular in shape, and appears on the map in the form of a huge easy-chair fronting the east and with the top to the north. It is only about fifty miles wide at its northern boundary, but it extends 320 miles on the southern boundary, while its length across the western front is 485 miles.

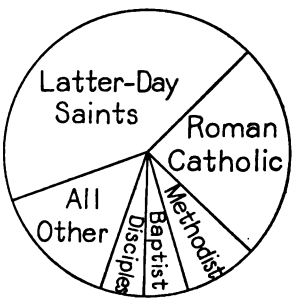
Its People. In population Idaho, with its 325,594 inhabitants in 1910, ranks forty-fifth among the states of the American Union (in 1915 the estimated number of people was 411,996). The average number of persons to the square mile was 3.9 in 1910, as compared with a density of 30.9 per square mile for the whole of the United States. The state has regularly doubled its population during the last four census periods. Of the total population of Idaho, 40,427, or 12.4 per cent, were foreign-born whites; 3,488, or 1.1 per cent, were Indians; 2,234, or 0.7 per cent, were Asiatics, and 651, or 0.2 per cent, were negroes. Of the native white population 75,195, or 23.1 per cent, were of foreign or mixed parentage.

Nearly three-quarters of the total population of Idaho live in rural communities, and only twenty-seven per cent in cities with 2,500 inhabitants or over. The increase in the population of the towns, which has been such an important feature in the movement of the population in the whole of the United States, has been especially strong in Idaho. Here during the first ten years of the twentieth century, the urban population showed an increase of 216.2 per cent. In 1900 there were only two places with over 2,500 inhabitants; in 1910 their number had increased to twelve. The principal cities are, Boise, the capital, the largest city in the state; Coeur d'Alene, Lewiston, Pocatello, Twin Falls, Moscow and Wallace; the most important are described under their titles in these volumes.

Religion. The strongest Church here, just as in the neighboring state of Utah, is that of the Mormons, who comprise about forty per cent of the population. Next in numbers

come the Roman Catholics, with about twenty-five per cent, while of the Protestant churches the Methodists and the Presbyterians have about an equal number of adherents.

Education. From an educational point of view Idaho occupies a leading position among the states of the Union, as shown by the statistics of illiteracy. Thus in 1910 only a small proportion of the population, 2.2 per cent, was unable to read and write. Idaho possesses a well-developed system of public elementary schools, which has been greatly improved by a law passed in 1912. According to this law the general supervision, government and control of all educational institutions is intrusted to a state board enjoying wide powers, whose members are appointed by the governor for six years. At the head of the school system is the state commissioner of education, and each county has its own superintendent, elected by the people for two years.



RELIGIONS IN IDAHO

At the head of the educational institutions stand the University of Idaho, situated at Moscow and founded in 1889, and the state academy for industrial and technical training, at Pocatello. The state maintains normal schools for the training of teachers at Lewiston and Albion; an agricultural and technical school at Idaho Falls; and high schools in the towns, which were attended by 6,000 pupils in 1914. Various religious denominations also maintain several high schools and colleges; the most important of them is the College of Idaho, situated at Caldwell and maintained by the Presbyterians, but open to pupils of all denominations.

Charitable and Penal Institutions. The state maintains a sanitarium for feeble-minded and epileptics near Nampa, where an asylum for the insane is also located. Other hospitals for the insane are at Blackfoot and Orofino. The state penitentiary is located at Boise, the capital; a soldiers' home is also maintained in the same city. Juvenile offenders of both sexes are sent to the industrial and reformatory school located at Saint Anthony.

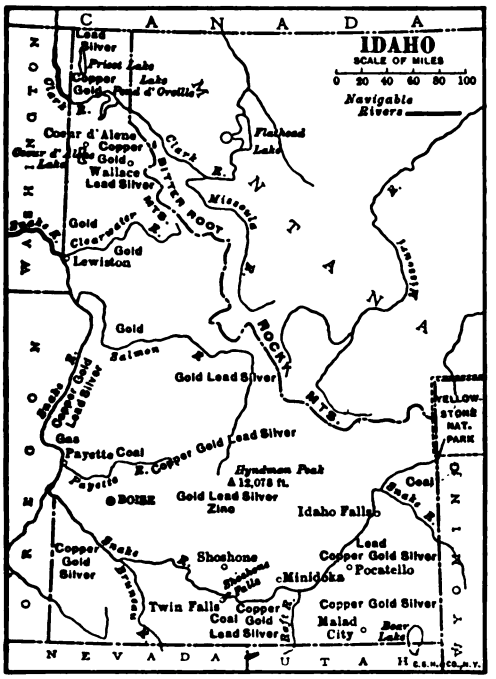
Physical Features. Idaho is a mountainous state, its mean elevation being about 4,500 feet above sea level. Lewiston, on the western border, is the lowest point in the state, at an altitude of only 738 feet above sea level, while Hyndman Peak, in the Sawtooth Range, is the highest, reaching an altitude of 12,078 feet. Idaho is divided naturally by the Salmon River Mountains, which traverse the state from northwest to southeast, into sections, known as Northern and Southern Idaho. Ranges of the Rocky Mountains system traverse Northern Idaho. Southern Idaho, and especially the southwestern part, is traversed by the Salmon River Mountains and their offshoots. This region, characterized by its rugged ridges, lofty summits, wild Alpine scenery, numerous glaciers and picturesque lakes, is one of great natural beauty. Throughout the state mountains and highlands are interspersed with deep, fertile valleys and level plains.

The most important feature of the southeastern section of Idaho is the vast arid plain of the Snake River basin, extending for a distance of 350 miles in length, fifty to seventy miles in breadth, and having an area of 30,000 square miles. The characteristic vegetation of these plains is a thick growth of sagebrush, and that, coupled with the great scarcity of water, have given them the appearance of a desert (see AGRICULTURE, below). Well-known landmarks of this region are the three isolated hills, commonly known as *buttes*, which rise suddenly above the plain, namely, the Big Butte, 2,350 feet high; East Butte, 700 feet high; and Middle Butte, 300 feet high.

Scenery. Many of the rivers flow through deep canyons which are remarkable for the beauty and grandeur of their scenery. The Snake River, the chief river of the state, flows for a distance of nearly 600 miles through a deep canyon, whose walls vary from a few hundred to thousands of feet in height. In fact, some of the most magnificent sights in the west are to be found here. Such are the Shoshone Falls, where the river, 950 feet in width, makes a sudden plunge of nearly 200 feet. These falls exceed those of the Niagara in height and certainly rival them in grandeur, though not in width. Above these falls, extending a few miles back, are several smaller falls and cataracts. Other falls of the Snake River worthy of mention are the American Falls, the Twin Falls and the Idaho Falls. On the Salmon River, the other principal river in the state, occur the Salmon Falls. In its rivers and falls, which can be utilized for the production of power, Idaho possesses one of

its chief natural resources. A number of modern plants for the production of power on a large scale have already been erected.

Climate. Considering its mountainous character and its northern situation, Idaho enjoys a climate that is mild, free from extremes and remarkably healthful. These mild conditions are due first to its nearness to the Pacific



IDAHO

The map shows the boundaries of the state, the leading cities and rivers, the locations of mineral deposits and the highest point of land.

Ocean, and secondly to the protection afforded by the great continental divide. In the mountain districts the winters are severe, with heavy falls of snow, reaching seven to ten feet deep. But even here some of the valleys are so sheltered that flocks of cattle are able to roam at large throughout the year. The heavy snowfalls feed afterwards the numerous streams, and their water is stored for irrigation purposes, for the southern and central portions of the state receive practically no rain during the summer. The mean annual temperature through the whole state is 45.5° F.; the average highest summer temperature is 100.8° F., while the average lower temperature in winter reaches 21.5° F.

Forests. In Idaho are to be found some of the largest virgin pine forests in the world. The forests constitute one of the richest natural resources of the state, covering nearly one-fourth of its surface. It is estimated that five per cent of the timber of the nation is found in Idaho, and that its total stand amounts to about 129 billion feet, board measure. About 20,000,000 acres of timbered land has been enclosed in the national forest reserves. Its forests contain evergreen and stately white pine, gigantic red or Douglas fir, yellow pine, spruce, birch, willow and hemlock. A great quantity of logs are floated down the Clearwater River to Lewiston, which has become an important lumber market.

Agriculture. In spite of great natural disadvantages, agriculture has made great strides during the last few years in Idaho. Except in the fertile broad valleys of the famous Panhandle district, situated in the northern part of the state, the soil is generally arid. The region most suitable for agriculture lies in the southern and central portions, namely in the level plains found along the Snake River basin and its tributaries. But the lack of rain makes it practically valueless in its natural state. It is here that extensive irrigation works have been constructed, which have transformed a forbidding desert into smiling gardens and fertile wheat-fields.

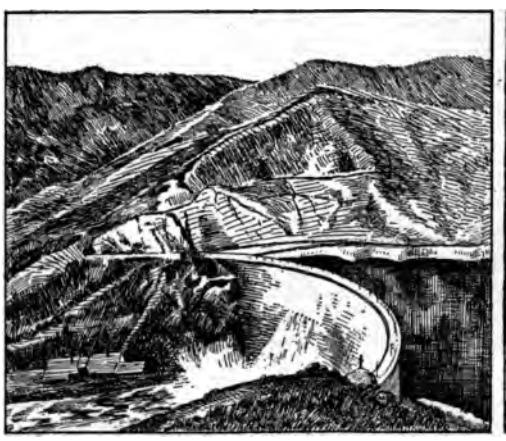
Irrigation Works. Up to the present Idaho possesses nearly 2,750,000 acres of irrigated lands. It occupies fourth rank among the states of the Union as regards its acreage under irrigation. Some of the greatest irrigation works in the world are situated here. Especially worthy of mention is the Arrowrock Dam, a storage dam built across the Boise River, which is 349 feet high, crest length 1,060 feet, with a reservoir capacity sufficient to cover 245,000 acres with water to the depth of one foot. This is the highest masonry dam in the world, and the concrete in its building amounted to 530,000 cubic yards. Among the large projects that are nearly completed are the Boise works, known as the Salmon River dam, which will irrigate about 260,000 acres.

Other great dam works are the dam across the Snake River at Minidoka, which diverts water for irrigating 119,000 acres, and the great dam at Milner, also across the Snake River.

Products of the Soil. About ten per cent of the total land area, which is about 53,346,560 acres, is occupied by farms, less than twelve per cent of which are worked by tenant farmers. Until 1915 by far the most important crop, both as regards acreage under cultivation

and value of products, was hay and forage plants of all sorts, of which clover and alfalfa were the most valuable. The average yield per acre is very high; only two states in the Union, Arizona and Nevada, show a larger production of hay per acre than Idaho. Since 1915 wheat has become the state's leading crop, and a large proportion of it is winter wheat raised by dry-farming methods, especially in the eastern parts where the greatest fall of rain occurs in the spring (see DRY FARMING). In the broad and sheltered valleys nestling among the mountains, apples, plums and prunes, peaches and cherries are grown.

state are both varied and extensive. It was indeed the discovery of gold in 1860 in the Coeur d'Alene district which started the first great rush of settlers towards this region. But at present the production of gold, although still important, is greatly surpassed by that of other metals, namely lead, silver, zinc and copper. The center of the industry is still the Coeur d'Alene district, where rich lead and silver ores are found. These mines are in fact among the richest in the world. Lead forms about sixty per cent of the value of the mineral products of the state, and Idaho and Missouri are the foremost lead-producing states of the Union.



ARROWROCK DAM

SALMON RIVER DAM

The Arrowrock dam and storage lake is eight miles above Boise. Its height is 349 feet, giving it the distinction of being the highest dam in the world. The storage reservoir will hold enough water to cover 245,000 acres to the depth of one foot. The Salmon River dam is 220 feet high; along the top for its length of 500 feet is a carriage road. Its reservoir will hold sufficient water to cover 260,000 acres to the depth of one foot.

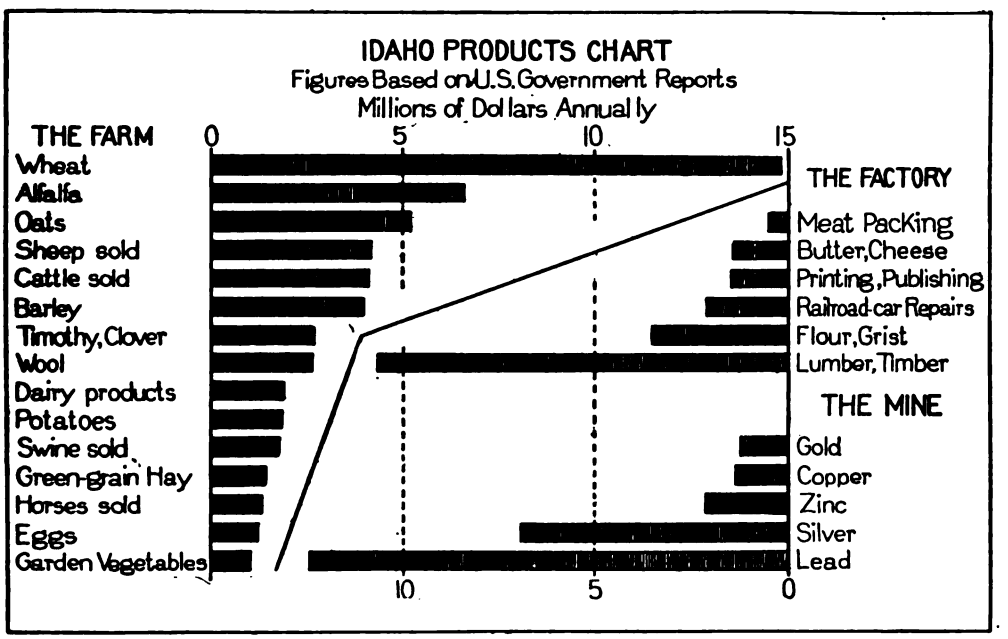
Stock Raising. The raising of live stock constitutes one of the principal occupations of the people, for in this state we still find great areas, estimated at over 25,000,000 acres, utilized for grazing purposes. It is a common thing to find in Idaho large ranches, some of them exceeding 100,000 acres in extent. Numerous herds of cattle roam over the plains of Southern Idaho and in the sheltered valleys in the north. The raising of cattle is, however, surpassed in importance by the raising of sheep. Idaho, with its 3,000,000 sheep in 1915, ranked fourth in the Union as regards production of wool. Boise is one of the most important inland wool markets in the United States. The sheep graze in the mountains during the summer and are brought down in the valleys and the plains in winter.

Minerals. Mining is one of the leading industries, and the mineral resources of the

The yearly output of lead averages 350,000,000 pounds, valued at $14,000,000. Next in importance comes silver, with a yearly production valued at $5,000,000 to $7,000,000. In the production of silver Idaho ranks with Nevada, Montana and Utah among the first four states of the Union. Gold of the yearly value of over $1,000,000 is extracted, mainly in the basin of the Boise River, near the capital of the state, and in that of the Snake River. Extensive and rich copper fields have recently been discovered and the production of copper is yearly increasing in value.

As the name Coeur d'Alene is mentioned several times in this article, it is perhaps useful to explain the meaning and origin of the word. This is the name of a tribe of Indians, and it is the French translation of the Indian name, and means *heart of an owl*. It was the name of a chief noted for his cruelty.

Manufactures. As in every thinly-settled and newly-established community, the manufacturing industries are not very well developed. But even these have shared in the general advance, and showed a rapid increase during the last few years. It is only natural that in a state like Idaho, lumbering should be the leading industry. At Potlach, in Latah County, Idaho possesses one of the largest lumber mills in the United States, and perhaps in the world. This mill has a capacity to produce 750,000 feet of lumber a day. The manufacture of flour is also of some importance.



Transportation. The mountainous nature of the country has been a great drawback in the building of railroads, but nevertheless the mileage has more than doubled since 1905. Of the 3,577 miles of railroad in the state, the Oregon Short Line, which traverses the southern part of Idaho, had 1,336 miles in 1914; the Northern Pacific had 320 miles; the Chicago, Milwaukee and Puget Sound line had 180 miles; and the Great Northern had eighty miles. Among the local lines the Oregon-Washington Railroad and Navigation Company had 135 miles and the Spokane International Railway Company had 122 miles. Since 1913 Idaho possesses a Public Utilities Commission, consisting of three members, which investigates the rates charged by the railroads and express companies, and sees that these are just and reasonable. The members of this commission constitute also the State Tax Commission.

There is very little water transportation in the state, as its principal rivers present many obstructions and waterfalls. The greatest need of the present is the building of a railroad which would traverse the central portion of the state, establishing communication between east and west.

Government. Idaho is governed under a constitution adopted in 1889, just prior to its admission to the Union as a state. Up to the present there have been twenty-two amendments to it. As in most states, an amendment to the constitution may be proposed in either branch of the legislature and, if adopted, is presented for the approval of the people at the next general election. Any convention elected to revise or amend the constitution must consist of a number of members not less than double the number of members of the state House of Representatives.

The *legislative* power is vested in the usual two houses, a Senate and a House of Representatives. The House of Representatives is composed of at least one member from each county, and it must never exceed three times the number of Senators. In 1914 the House had sixty-one members and the Senate thirty-three members. The members of both houses are elected for a term of two years. Sessions

of the legislature are held every two years, commencing on the first Monday after the first day of January. Idaho sends two members to the United States House of Representatives.

The *executive* officials, governor, lieutenant-governor, secretary of state, auditor, treasurer, attorney-general and superintendent of public instruction, are elected each for a term of two years. The governor has the usual veto-power, and the lieutenant-governor is president of the Senate. These officials constitute a state board of land commissioners, which has direction, control and disposal of the public lands.

At the head of the *judicial* department is the supreme court, consisting of five justices, each elected by the people for a term of six years. Below this there are nine district courts, each with one or two judges, elected direct by the people for four years. A prosecuting attorney is elected by the people for each county and his term of office is two years.

For purposes of local government the state is divided into counties, but the most important government units are the cities. A city charter may be granted to any town with a population of over 2,500 inhabitants. Since 1911 such cities may adopt the commission form of government.

History. *Beginnings.* It was at the beginning of the nineteenth century that white men penetrated this region. In 1805 Lewis and Clark were the first to explore those parts which are now known as Idaho (see LEWIS AND CLARK EXPEDITION). The town of Lewiston and the Clark River commemorate the names of these early explorers. But, with the exception of fur traders and prospectors, the region did not attract many settlers until 1860. In that year Captain Pierce found gold in the region around Orofino. The news spread rapidly, and settlers from all parts rushed to the new Eldorado, as they had rushed to California a decade earlier.

Formation of a Territory. Three years later the region was organized as the Territory of Idaho, which, however, comprised the whole of Montana and nearly the whole of Wyoming. In 1864 Montana and in 1868 Wyoming were separated from it, and the territory assumed its present size and area. Since that time the progress has been rapid and steady. For a few years the settlers suffered more or less annoyance from the Indians, but these were finally induced to part with most of their land and retire upon reservations.

Many Mormons settled in the southern part of the state, and their numbers excited such alarm that the legislature in 1883 passed a law depriving them of the right to vote. When in 1893 the Mormon Church rejected polygamy as a necessary part of its creed, all Mormons with one wife were again enfranchised.

Progress as a State. In 1889 the territory adopted a new constitution, and in the following year, July 3, 1890, Idaho was admitted as the forty-third state in the Union.

With the growth of the mining industry conflict between the miners and the mine-owners became frequent. In 1892 a strike at the Coeur d'Alene mine lasted six months, and was accompanied by riots and more serious conflicts between union and non-union miners. Federal troops had to be called in to restore order. Another strike, also accompanied by much violence, broke out in 1899, and also necessitated the use of the Federal troops. Bitter feeling continued long after this strike and culminated in the assassination of ex-Governor Steunenberg in 1905. The murder attracted national attention, and the chief officials of the Western Federation of Miners were arrested, charged with complicity in the crime. After a trial characterized by many sensational incidents they were acquitted.

In 1896 an amendment to the constitution was approved by the people granting the franchise to women on the same terms as to men. For dealing with the liquor problem Idaho has adopted state-wide prohibition since January 1, 1916. From 1909 until that time the state was under local option. In 1912 an amendment to the constitution was carried introducing the initiative, the referendum and recall. From these measures and others noticed in the course of the article it can be seen that Idaho is one of the most progressive states in the Union.

Other Items of Interest. The wheat grown in Southern Idaho is of a variety particularly suited for the making of macaroni.

The Indians of the state, who are of seven different tribes, live on four reservations, on each of which a school is maintained.

Idaho has many mineral springs and hot springs, no fewer than eleven of the counties possessing them. Water with a temperature of 165° flows from many wells at and near Boise.

The farmers who obtain the largest yield from their land are the Chinese, the value of whose crops per acre is about fifteen times

RESEARCH QUESTIONS ON IDAHO

(An outline suitable for Idaho will be found with the article "State.")

What does the name *Idaho* mean, and to what does it refer?

What city name recalls the early Indian inhabitants of the territory? What is supposed to have been the original significance of the name?

Where is there a waterfall which surpasses Niagara in height?

What part did the mineral deposits have in determining the early history of the state?

How much larger was the original Territory of Idaho than the present state?

What is the most noticeable difference between the chart of religions of Idaho and that of any Eastern state?

What advantage do the farmers in the valleys derive from the heavy snowfalls in the mountains many miles away?

When was Idaho admitted to the Union? How many states have been admitted since that date?

How does the illiteracy percentage compare with that of Illinois? With that of the United States as a whole?

If 50,000,000 board feet of timber were cut in the state each year, how long would the present supply last?

How many feet of lumber can the largest mill in the state cut in one day?

What has been the stand of Idaho on the liquor question? On the suffrage question? Mention other legislation which proves the progressive character of the state.

How are the Indians cared for in the educational scheme?

What is peculiar about the waterways of Idaho?

What region is suited for agriculture without irrigation?

What is the great transportation need of the state? Why are the rivers not more widely utilized for navigation?

How does the state compare as regards density of population with the country as a whole? If the population of New York and Idaho were exchanged, how much more densely would the latter state be populated than it is at present?

What are *buttes*? Where do they constitute a characteristic feature of the landscape?

Where are the sheep pastured in the summer? In the winter? Why is it possible in some places in this northern state for sheep and cattle to graze out-of-doors all winter?

Who were the first white men to explore this region? How have their names been honored in the state?

How many states are larger than Idaho? Have all the states which are larger a greater population?

How much above the lowest point in the state is the highest point? How does the average elevation compare with that of Colorado?

How does the state rank as regards production of hay to the acre? What method is employed in the raising of wheat?

How is the disposition of the public lands regulated?

What extraordinary gains in population has the state shown in the last four decades?

that obtained by white farmers. The Chinese practice intensive farming, and raise chiefly market vegetables.

The usual law of riparian rights (which see) does not hold good in Idaho, for all the waters of the state are reserved for public use. O.B.

Consult McConnell's *Early History of Idaho;* Bancroft's *Washington, Idaho and Montana.*

Related Subjects. The reader interested in this subject is referred to the following articles in these volumes:

CITIES AND TOWNS

Boise	Lewiston
Coeur d'Alene	Pocatello

LEADING PRODUCTS

Alfalfa	Sheep
Clover	Silver
Copper	Wheat
Gold	Wool
Lead	

UNCLASSIFIED

Butte	Mormons
Irrigation	Snake River

IDAHO, UNIVERSITY OF, a state university founded in 1889 at Moscow, and opened for instruction in 1892. Tuition will always be free to both men and women students who reside in the state, and up to 1916 no tuition had ever been charged to students from other states. The university maintains a college of letters and science, including home economics, music and forestry, and colleges of engineering, agriculture and law. Agricultural experiment stations and movable schools of agriculture—the latter in connection with an agricultural extension service division—are also conducted by the institution. Freshmen and sophomores are required to take military drill. The faculty numbers about eighty, with an extension staff of seventeen, and the student enrolment is about 860. The school is equipped with a library of 39,000 volumes and 8,000 pamphlets, and with buildings valued at over $500,000.

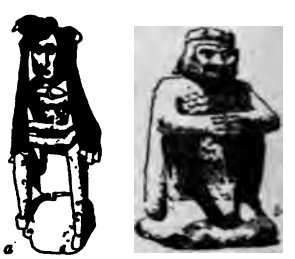
The University of Idaho seeks to maintain as its aim, "Idaho education for Idaho youth," and to offer service to every person in the commonwealth. The school stands for the highest ideals of American citizenship, for strong and sturdy scholarship, for the best there is in character and the best there is in life. It is making no strong appeal for a great and unorganized student body, but rather is insisting upon the highest standards of scholarship for admission and for continuance within its walls and for the highest kind of reliable service throughout the entire state. M.A.B.

IDES, the fifteenth day of March, May, July and October in the Roman calendar, and the thirteenth day of the remaining months of the year. The name is derived from an obsolete Latin word meaning *to divide.* The fifteenth divided the month of thirty-one days into two nearly equal parts. Julius Caesar was warned to "beware the Ides of March," the day on which he was assassinated.

IDIOM, *id'ium,* a peculiar mode of expression of one's thought; the use of words characteristic of a particular language, especially an allowable irregularity; a form of speech peculiar to a writer or a tongue. An idiom or idiomatic phrase is an expression whose meaning is different from the literal meaning of its parts. The following are examples: to come by (obtain), to put up with (tolerate), to bring about (accomplish), to carry out (accomplish). The term is also applied to a peculiar jargon or dialect of a language.

ID'IOT, a person of a very low order of intelligence. Such a condition may be present from birth, or it may be induced by accident or neglect in infancy. In law, an idiot is one who from birth has been without understanding. He cannot be held accountable for commission of crime, cannot enter into any contract or be held in any way responsible; he can, however, inherit property, which is thereafter held for him by a trustee.

I'DOL, a word derived from the Greek *eidolon,* meaning *an image,* is applied to representations of gods or of superhuman persons. The conviction that there is either a supreme being or a number of spirits guiding earthly affairs has been implanted in the human breast since the beginning of history. The desire to see the gods, or at least to look at images of them, was but natural. The conception of what the ruling spirit really was, varying of course according to locality, imagination and tradition, was embodied in some image, which usually took the form of a man. Combinations of human and animal forms occurred, and even animal forms alone were not rare, but man from the earliest time has generally



TWO FORMS OF IDOLS
(a) Worshiped by natives of the Philippine Islands before they had been reached by Christianizing influences. (b) An old Aztec idol.

led the supreme power as a being in n form. Images were erected in promi- places, sometimes out-of-doors, sometimes nples. To the beholders they symbolized ods they worshiped, and as in some coun- there were held to be a great number of numerous idols were made, each one lenting some particular deity. After tianity was proclaimed idols were re- d by Christians as sacrilegious, but cer- images with deep religious significance retained as symbols to be venerated, and o used to-day in the Roman Catholic ch.

latry. It was not long before those early es who had made for themselves graven s as symbols began to regard those s as gods in truth. As gods, or as the s of the spirits, they were worshiped. A in the presence of his idol felt himself lly in the presence of his god. The iets of old warned the Jews against the ice of bowing down to idols of wood and . The protest was not directed against ymbol or image, but against the worship e idol instead of what it represented. hammed conceived such a dread of the of idolatry that the Koran expressly ls the reproduction in wood, stone, metal, ing, or in any way whatsoever, of the e of any living thing. Buddhism and nanism still retain images, and their re- s ceremonies closely approach a form of ry. On the west coast of Africa and g some inland tribes a form of idolatry n as *fetish* is still common. Even inani- objects are credited with great powers il and are worshiped according to the ex- f their supposed influence. The spread of tianity and enlightenment and the vast nce of modern civilization are gradually g all forms of idolatry out of existence.

LL, or **IDYL**, *i'dil*, from the Latin *um*, meaning *a little image*, a term which nates a kind of poem representing simple s of pastoral (rural) life. But it is not tial that the idyll be exclusively pastoral, ny of the famous idylls of ancient poets ot wholly rural in character. To consti- a poem of this class it should present to a complete picture in small compass, as guished from the formal epic. However, yson's *Idylls of the King* is an epic in and treatment and romantic and tragic ject matter, as shown by the lines given ; it is therefore difficult to draw an exact line as to what may or may not be called an idyll:

Nor ever yet had Arthur fought a fight
Like this last, dim, weird battle of the west,
A deathwhite mist slept over sand and sea:
Whereof the chill, to him who breathed it, drew
Down with his blood, till all his heart was cold
With formless fear; and ev'n on Arthur fell
Confusion, since he saw not whom he fought.
For friend and foe were shadows in the mist,
And friend slew friend not knowing whom he slew;
And some had visions out of golden youth,
And some beheld the faces of old ghosts
Look in upon the battle; and in the mist
Was many a noble deed, and many a base.

IDYLLS OF THE KING. Tennyson's poem of this title is a beautiful epic of Arthur, the hero-king of the Britons (see ARTHUR, KING). It was completed in 1889, after the poet had worked on the stories at intervals for a period of fifty years, and is divided into twelve parts, or idylls. Each idyll centers about a particular incident in the life-drama of the great personage who dominates the entire narrative. Beginning with *The Coming of Arthur*, the poet carries the story through the building up of the kingdom; the establishment of the Round Table; the unhappy love of Guinevere for Lancelot, the king's trusted knight; the exploits of the knights in their quest for the Holy Grail; the remorse and flight of the queen, and the final triumph of the king's enemies and his own death in the "last, dim, weird battle of the west."

In *The Passing of Arthur*, the closing idyll of the series, the poet strikes the high notes of his rich fancy and gift for exquisite verse making. The simple, tender language of the king as he lay moaning in his tent is an admirable illustration of Tennyson's quieter mood:

I found Him in the shining of the stars,
I mark'd Him in the flowering of His fields,
But in His ways with men I find Him not.

Again there are passages of splendid beauty and of rich, imaginative quality, a striking example being the description of the sword Excalibur as it was flung into the sea by Sir Bedivere, in response to repeated commands, as the king lay dying:

The great brand
Made lightnings in the splendor of the moon,
And flashing round and round, and whirl'd in an arch,
Shot like a streamer of the northern morn,
Seen where the moving isles of winter shock
By night, with noises of the Northern Sea.

IGNATIUS, *ig na'shi us,* SAINT, bishop of Antioch, one of the early Christian martyrs. He is credited with the authorship of seven Greek epistles bearing his name, which are included among the works of the apostolic fathers. These give evidence of his earnest, devoted spirit and intense religious enthusiasm. Ignatius is supposed to have been born in Syria, about the middle of the first century, and to have been a disciple of the apostle Saint John. About A. D. 107, at the command of Emperor Trajan, he was thrown to the wild beasts in the arena at Rome.

IGNATIUS OF LOYOLA. See LOYOLA, IGNATIUS OF.

IGNEOUS, *ig'ne us,* **ROCKS.** Granite, quartz and various other rocks are masses of crystals, cemented together by some other substance. We know that when we melt sugar or dissolve alum in hot water and allow the mixture to cool, it forms crystals. From this knowledge we are safe in forming the conclusion that the rocks named above were once in a molten state and that when they cooled they formed the crystals we now see in them. Because these rocks were formed by the action of heat, they are called *igneous rocks,* for *igneous* means *fire,* or *burning.* See GEOLOGY.

IGNIS FATUUS, *ig'nis fat'u us,* a Latin term meaning *foolish fire.* It is applied to a singular luminous appearance resembling a pale flame, sometimes seen hovering over marshy places and, also, according to somewhat doubtful tradition, in churchyards at night. It is called will-o'-the-wisp, spunkie, Jack-o'-lantern and other names in the different sections in which it is said to occur. There has always been some doubt as to its actual existence, and many scientists have investigated the phenomenon. They have never arrived at satisfactory conclusions, but those who firmly believe in its existence account for it as the result of spontaneous combustion of gases.

IGORROTE, *e gohr ro' tay,* or *e gohr roht',* a tribe inhabiting certain portions of the island of Luzon, Philippine Islands. The name means *mountain people,* and was at one time indefinitely applied to the inhabitants of mountainous parts of several of the islands in the Philippine group. The Igorrotes were by nature through generations of training a warlike race and were head-hunters until they were subdued by United States troops and turned to the arts of peace. Hundreds of them are now soldiers engaged in guard duty over tribes whose heads they once sought as trophies of war. They are skilful agriculturists and quickly learned to adopt many of the ways of the "white brothers." Some of their houses have two stories, the lower being used as work-

PAST AND PRESENT

The first picture is that of an Igorrote boy i 1906; all of his tribe were of his stage of civiliza tion. The second picture is of the same boy, nin years later.

shop and living room, the upper serving as storeroom and kitchen. The number of th tribe is estimated at 211,500. L.F.

IGUANA, *ig wah'nah,* a genus of lizar containing a great number of slightly diffe ing species, common in South America, bu found also in the southwestern part of th United States, Mexico and Central Americ

IGUANA

A West Indian species, closely related to thos in Southwestern United States.

The iguana is a timid, defenseless anima though it is decidedly formidable in appea ance. Along its back to the tip of the ta runs a row of spiny, pointed scales; the toe are armed with strong, sharp claws, with whic it readily climbs trees. The color is usuall olive green, mixed with shades of brown. Som species have the power of changing their co

ors to adapt themselves to their surroundings and escape detection (see PROTECTIVE COLORATION).

Its food consists almost entirely of fruit and leaves, and it usually haunts the banks of streams, living in hollows of trees, in which it deposits its eggs. When disturbed, the iguana will at once attempt to reach the water, in which it swims with great speed and can remain below the surface for several minutes. Although provided with webbed feet, it trusts entirely to its tail when swimming, the feet being held perfectly still. The flesh is highly esteemed in South America and is said to rival chicken in delicacy of flavor. The eggs are also palatable, and are usually eaten raw.

IGUANODON, *ig wahn' o don,* a fossil lizard found in Europe, deriving its name from the similarity of its teeth to those of the iguana. The species were of colossal size, some individuals having been thirty feet long. The head was large and narrow, the jaws were heavy and were supplied with very large teeth. The forelimbs, which had four toes and a spur and were much shorter than the large, three-toed hind legs, were used for grasping and holding rather than for walking. The tail was long and heavy, in this respect like that of the kangaroo, and it steadied the animal when standing or swimming. The iguanodon lived in great numbers in the swampy regions of England and Belgium. The best preserved specimen, which is a practically perfect skeleton, was found in Belgium, and, as mounted in the British Museum, is fourteen feet high and twenty-eight feet long.

IGUANODON
As it is supposed to have appeared.

IK MARVEL, the pen name of DONALD GRANT MITCHELL (which see).

IL'IAD, regarded by many as the greatest epic in the world, is ascribed to the ancient Greek poet, Homer. Whether Homer wrote it, or whether it is actually a folk-epic built up through generation after generation and given its final form by Homer; whether, indeed, there ever lived such a person as Homer —these questions have been studied by some of the world's greatest scholars, and are still unanswered. The quantity of literature which has grown up about this one poem is enormous, and still men's interest in it continues.

The Story. The twenty-four books of the Iliad deal with the Trojan War, but not with all of it. The causes, the early events and the final outcome of that struggle, all of which must be understood if the poem is to be appreciated, are treated in separate articles (see list below).

Sing me, goddess, the wrath, the wrath of Pelian Achilles;
Ruinous wrath, which laid unnumbered woes on the Grecians.

begins the poem, and the greater part is taken up with a description of the wrath of the great Achilles over an insult offered him by Agamemnon and with the tragic results of that wrath to the Greeks. In all, only about forty days are covered.

Sulking in his tent, Achilles hears with indifference of the repeated defeats which the Greeks have met because of his absence. At length the Trojans, secure in the feeling that Achilles hates his commander, Agamemnon, worse than he despises them, prepare to set fire to the Grecian camp. Patroclus, the kinsman and best-loved friend of Achilles, prevails upon Achilles to lend him his armor, and with it proceeds to battle. His death at the hands of Hector rouses Achilles, who dons a new suit of armor made for him by Vulcan, and in his turn meets and kills Hector. The body of the brave Trojan he drags at his chariot wheels,

HECTOR'S BODY DRAGGED BY THE CAR OF ACHILLES

but at length yields to the pleas of Priam, the aged father of the hero, and gives it up. With an account of the funeral rites the poem concludes; there is no word of the wooden horse by which the Greeks finally brought about the destruction of the city. Throughout, the gods take a prominent part, some helping the Greeks, others the Trojans.

Its Value. It is not simply that the *Iliad* tells a fascinating story in a straightforward,

simple way, nor that its thought is consistently lofty and its lines swinging and majestic; it is, in addition to all this, a record of antiquity, and very much that is known about the modes of life and of thought in those far-away times has been learned from its pages. R.D.M.

Good translations of the *Iliad* may be purchased at bookstores.

Related Subjects. The following articles in these volumes will repay reading in this connection:

Achilles	Menelaus
Aeneid	Mythology
Agamemnon	Odyssey
Epic	Paris
Hector	Troy
Helen of Troy	Ulysses
Homer	Wooden Horse

ILLINGTON, *il' ing ton,* MARGARET (1881-), an emotional actress, born at Bloomington, Ill. Her maiden name was MAUDE LIGHT, the name *Illington* being a combination of her native state and city. She studied dramatic art in Chicago and made her first professional appearance with James K. Hackett in a small part in *The Pride of Jennico;* later she played the heroine of the same drama. As leading woman to E. H. Sothern in *If I Were King* and as Henriette in the all-star cast of *The Two Orphans,* she added fresh honors to an already successful career. In 1907 she appeared as joint star with Kyrle Bellew in *The Thief,* and has since starred in *The Lion and the Mouse, His House in Order, Kindling,* and *The Lie.* After her divorce from Daniel Frohman, she married Edward J. Bowes, of Seattle, Wash., in 1909. For a time she retired from the stage, but she returned to it in *Kindling,* a new success.

MARGARET ILLINGTON

ILLINOIS, *il i noi'* or *il i noiz',* one of the great north-central states of the American Union, a state whose vast stretches of rolling, grassy land have earned for it the title of the PRAIRIE STATE. It was named for the Illinois Indians, to whose home in the region many names bear witness—Kaskaskia, Peoria, Michigan, and above all, Starved Rock; relics of the Indians are found in various places, of which the Cahokia Mound is the most noteworthy. The violet has been chosen as the state flower, but this is in no way symbolic of the state, which has always been progressive and in the forefront, rather than inclined to lurk under any "mossy stone" of obscurity.

Size and Positional Advantages. In size Illinois ranks twenty-first among the states, having an area of 56,665 square miles, a little more than one-fifth that of Texas. Its length from north to south is 385 miles, its greatest breadth, between Vermilion County on the east and Adams County on the west, is about 218 miles. Few states illustrate in their history and industrial development more interestingly than does Illinois the advantages of a favorable location. With Lake Michigan on the northeast, the Mississippi River all along its western border, the Wabash River on the southeast and the Ohio on the south, it has had none of that remoteness from which a state so far inland might be supposed to suffer. Over these waterways, before a network of railroads spread over the state, the products of its remarkably fertile soil were easily despatched to the populous regions far to the east and to the south.

The People. At the date of admission of Illinois as a state (1818) there were relatively

few people north of Springfield. This was due to the fact that the territory was first peopled by permanent settlers from Kentucky and Tennessee; incidentally this migration from the south accounts for Abraham Lincoln as a citizen of Illinois. The northern part of the state did not develop until after the completion of the Erie Canal, after which immigration westward benefited Illinois. Not until five years after the opening of that waterway was Chicago platted; in 1830 that modest settlement covered less than one-half of a square mile and its voting population numbered twenty-seven.

In 1910, with 5,638,591 people, Illinois ranked third among the states of the Union in population, none of the great states to the west of the Mississippi and only New York and Pennsylvania among the Eastern states surpassing it. The average density of population in 1910 was 100.6 to the square mile, but this figure does not really convey a correct impression, for nearly two-fifths of the people live in the one city of Chicago. Illinois has been one of the states toward which immigrants have flocked in large numbers; in 1910 over twenty per cent of its population was foreign born, and over half was of foreign parentage. Of the foreign element the Germans are the most numerous, and immigrants from the United Kingdom of Great Britain and Ireland rank second. On January 1, 1917, a Federal estimate credited the state with 6,193,626 people.

In 1910 two-fifths of all the people lived in one county—the county of Cook, in which Chicago is located; while more than sixty-one per cent were living under city conditions, that is, in cities of 2,500 or more, and that despite the fact that Illinois is a strongly agricultural state. The cities which have a population of more than 25,000 number twelve, but the second largest, Peoria, is less than one-thirty-second as large as Chicago. The twelve cities in the order of their size are Chicago; Peoria; East Saint Louis; Springfield, the capital; Rockford; Quincy; Joliet; Decatur; Aurora; Danville; Elgin, and Bloomington. These and others are described under their titles in these volumes.

Religion and Education. As in most states with a large city population, the Roman Catholic Church is very strong, containing nearly half of all communicants; the various Methodist churches are next to the Catholic in point of strength. Other Protestant churches, such as the Baptist, Presbyterian, Congregational, Disciples' and Episcopal, also have large followings, and the number of Lutherans in the state is particularly noteworthy. This is accounted for by the very considerable German and Scandinavian population.

The state has an excellent system of free public schools which dates from 1855, and the percentage of illiteracy is only 3.7. Fourteen other states show a better average, but were it not for the negroes, with their percentage of 10.5, and the foreign-born whites, with their percentage of 10.1, the percentage of those ten years of age or over who are unable to read and write would be but a little more than one per cent (see ILLITERACY). The school system includes kindergartens, of the attendance upon which no official record is kept; grade schools, upon which attendance is compulsory between the ages of six and fourteen; 671 high schools; six normal schools, at Carbondale, Charleston, Chicago, De Kalb, Macomb and Normal; and the University of Illinois at Champaign and Urbana. Out of a possible school population between the ages of six and twenty-one of somewhat more than a million and a half, there were in attendance at the schools in 1914 about 1,011,000. Over 30,500 teachers are employed to teach these pupils, at an average annual salary of $648 each, and the total yearly expenditure for school purposes is about $40,000,000. Provision is made for the establishment of schools for defectives, and the state has always shown itself ready to try experiments which promised well, such as summer schools, open-air schools and schools for tubercular children.

In addition to the state institutions there are in Illinois many private schools of various grades from kindergarten to university. Among the institutions of college rank, of which there are not fewer than thirty, there may be mentioned as worthy of special note the University of Chicago; Northwestern University at Evanston; Armour Institute of Technology and Lewis Institute, both at Chicago; Knox College at Galesburg; and Loyola University and Saint Stanislaus College at Chicago.

Charitable and Penal Institutions. In recent years constantly increasing attention has been paid to the administration of these institutions. The legislature of 1909 made a thorough canvass of the methods used with success in other states, and the result was the appointment of a Charities Commission of five members, who act without salaries and who have in their hands the right to inspect and criticize the

administration of every state charitable and correctional institution. Auxiliary boards have a similar power in each county. There is also in the state a psychopathic institute, established in 1906 and widened in its scope in

ILLINOIS

The map shows boundary lines, principal cities and rivers, location of coal and gas fields and the highest point of land in the state.

1911, which has as its object continual study into the causes and treatment of insanity. Advanced methods, such as indeterminate sentence and the parole system, have also been used in connection with the penal institutions, while efforts have been made to check the growth of crime among the young by means of juvenile courts (which see). The honor system, which has attracted much favorable attention in some of the Western states, has been tried at the state penitentiary at Joliet, but not with entire success.

The state penal institutions are the penitentiaries at Joliet and at Chester, the State Reformatory for Boys at Pontiac and the Home for Delinquent Boys at Saint Charles, while the charitable institutions include eight hospitals for the insane, at Kankakee, Chicago (Dunning), Anna, Jacksonville, Elgin, Watertown, Peoria and Alton, the last-named established in 1913 and having in connection with it a colony for epileptics; the state school and colony for the feeble-minded at Lincoln; the soldiers' home at Quincy; the soldiers' orphans' home at Normal; the schools for the deaf and the blind, at Jacksonville, and the training school for girls, at Geneva. In the official names of most of the institutions such titles as "insane" and "feeble-minded" have been dropped.

The "Lay of the Land." Illinois is one of the most level states in the Union. It has a flat or undulating surface, and slopes gently to the south and southwest. Its highest point, in the extreme north on the Wisconsin border, is 1,241 feet above sea level, and its lowest, at Cairo on the Ohio River, is 267 feet above the sea. The extreme southern lowland section is known as "Little Egypt," and it is thought that it was here that Dickens, in *Martin Chuzzlewit*, planted his "Eden," with its swamps and miasma and resulting backwardness. The average altitude of the state is about 550 feet above sea level, and the chief elevations above that height are in the northwest and in the south, where a ridge from six to ten miles wide crosses the state, rising at times to a height of 1,040 feet. This is in reality a spur of the Ozark Mountains, and constitutes scenically the most beautiful part of the state, with its picturesque valleys, wooded ravines and sloping stretches clothed with hardwood forests.

Despite its low-lying position, the state has for the most part excellent drainage. No large territories are waste because of marshes, for there are within its borders no fewer than 275 streams, flowing into the Mississippi, the Wabash or the Ohio. Chicago River, very small but very important, formerly emptied into Lake Michigan, but the Drainage Canal turned its current so that to-day its waters find their way finally to the Mississippi. The greatest river within the state is the Illinois, which drains over half the area of the state and is navigable almost throughout its length. It is quite impossible, in this day of railroad travel, to estimate the part which this stream played in the early history and development of Illinois. Down it the first white men who visited the state found their way, and later it was the highroad for the products of its extremely fertile valley region—a region which to-day supports a large proportion of the population of the state. Near Utica, on the Illinois, where the bluffs rise tall and sheer from the river, is one of the most picturesque spots in the state, as well as one of the most interesting

historically—Starved Rock, where the Indians made their last stand. Near it is Deer Park, another of the beautiful small areas of the state, which in its maze of miniature canyons has surprises to offer even to those who have seen the great canyons of the West. Other important rivers are the Desplaines and Kankakee, which unite to form the Illinois; the Fox, Rock, Big Muddy, Kaskaskia, Sangamon, Little Wabash and Embarras.

Illinois has not the abundance of lakes of its two neighbors, Wisconsin and Michigan, Fox Lake and Grass Lake being practically the only two of any size and importance, and both are important summer resorts about forty miles from Chicago. Peoria Lake is but an expansion of the Illinois River caused by the sediment deposited by a tributary stream.

Climate. In most parts of the state the summers are very warm and the winters quite cold. Except in the northeast section, around Chicago, the Great Lakes exert very little influence on the climate. As in all states which have a considerable north-and-south length, there is a noticeable difference in the means of temperature in the extreme regions, the average in the south being 58° and that in the north but 47°. The range of temperature is greater in the north than in the south. The lowest temperature ever recorded in the state was 32° below zero, in the northwest portion, in February, 1905, while the highest, recorded at Centralia in July, 1901, was 115°. Violent changes are common in the state, for no mountain chains interfere with the sweep of the warm breezes up the Mississippi Valley from the Gulf of Mexico, or with that of the cold winds down from the north.

The average rainfall for the state is about thirty-eight inches, that of the south being forty-three inches and that of the north about ten inches less.

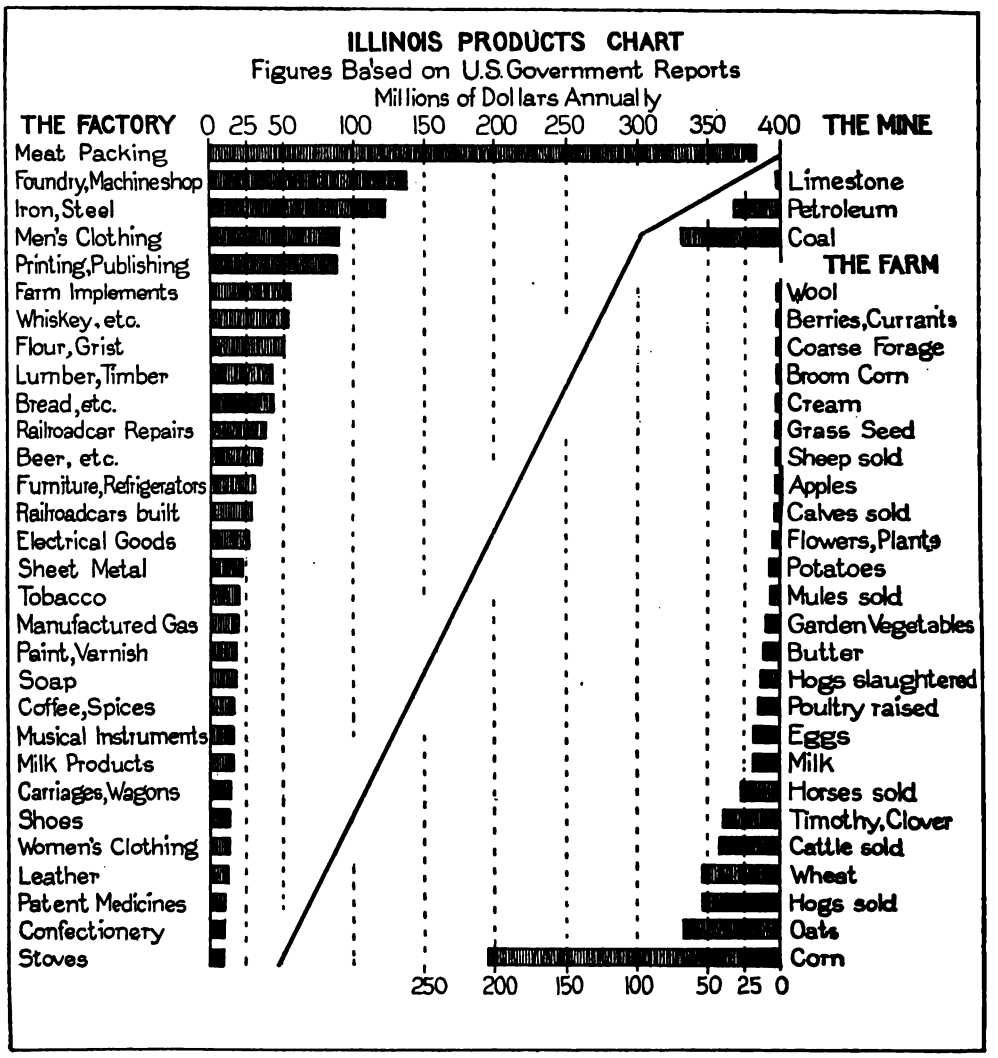
Mining. No other one mineral makes possible such industrial development as does coal, and of this valuable product Illinois has a large supply. The area of the coal beds is estimated at 42,900 square miles, the largest in any state, and of the 102 counties one-half have mines. More coal is produced in the southern than in the northern counties, and in all, the state puts on the market in a year over 50,000,000 long tons, only Pennsylvania and West Virginia producing more. In the production of petroleum, too, Illinois ranks third (1915), California and Oklahoma being the two states with larger output. The remarkable development of the state as an oil-producer has taken place since 1905, the output increasing within three years from a few hundred barrels to 33,000,000, then rapidly decreasing to 22,000,000 barrels in 1915.

In addition, excellent tile and brick clay is found in large quantities, fluor spar to a greater extent than in any other state, and lead, silver and zinc in small quantities. All in all, this state, which at first thought one would scarcely classify among the chief mineral-producing states, in 1914 ranked third among all the states in that respect.

Manufactures. No other state has shown such a remarkable development of the manufacturing industry within so short a time as did Illinois in the latter half of the nineteenth century. Its coal, its excellent river and lake transportation, and its rapidly-spreading railroads accounted for this in large measure, and this in its turn accounted for the increase in the number of cities and large towns. No other state west of the Alleghanies has such extensive manufactures, and of the Eastern states only New York and Pennsylvania excel it. Over sixty-five per cent of the total manufactured products of the state are made in Chicago, and in that city live more than three-fifths of the state's wage-earners employed in manufacturing establishments.

By all means the most important single industry is slaughtering and meat-packing, in which Illinois leads all the states. The total products of this industry, which is centered in Chicago, amount in a year to about $390,000,000. Next in importance are the foundry and machine-shop products, of which the annual output is worth about one-third that of the meat-packing and slaughtering industry. The manufactures of men's clothing, of agricultural implements, of flour and gristmill products, of iron and steel and of lumber and timber products are also of great importance, while the printing and publishing business has reached enormous proportions, being exceeded only by that of New York.

Most of the industries are rather sharply localized. Thus South Chicago and Joliet have the most of the iron and steel mills, receiving their iron ore by way of the Great Lakes from Minnesota and Michigan. Peoria has the greatest distilleries in the United States, the internal revenue collections for the ten-year period ending in 1915 exceeding $375,000,000, more than the cost of building the Panama Canal; Elgin is famous for its watches; Moline



and Chicago make most of the agricultural implements, and Chicago has a large proportion of the packing-houses, foundries, and clothing shops. Of more than 560,000 persons who are employed in the manufacturing establishments, one and one-half per cent are children under the age of sixteen, but over fourteen.

Agriculture. With remarkably fertile soil, plenty of water and a surface flat and easily tilled, Illinois is particularly well fitted for agriculture, and no state in the Union surpasses it in the value of its farm property. Over ninety per cent of its area is included in farms, and of the farm land over eighty per cent is improved. Illinois has been one of the foremost states in the introduction of improved methods of tillage, especially in the use of machinery, for which its level surface well fits it.

Frequently Illinois has ranked first among the states in the total value of its crops, but almost steadily for a half-century it has been first in the production of corn. Over 10,300,000 acres are devoted to this crop, and over 200,000,000 bushels are produced every year. Oats, the second crop of the state in acreage and in value, are produced in greater quantity only in Iowa; Illinois is no longer, as it was for over a quarter of a century, the largest producer of wheat, the great Western states having left it far behind. Despite this fact, the annual wheat crop is valued at about $60,000,000. Hay, potatoes, barley and rye, in that order,

are important products, and in the southern counties a small amount of tobacco is raised. Orchard fruits, especially apples; grapes, to the cultivation of which certain parts of the state are particularly well adapted; and small fruits, of which the most important is the strawberry, are also grown; and in the neighborhood of Chicago there are great truck gardens which send their produce to the city in the early morning hours.

Good grazing land, and plenty of hay and corn—these are the factors which have made of Illinois an important stock-raising state. Only Iowa competes with it in the number of horses and of hogs, while in its number of dairy cows Illinois ranks third. It is in the northern part of the state, within easy reach of Chicago, that the dairy industry has grown to large proportions.

Transportation. Illinois exceeds all other states except Texas in its railway mileage, and if yard track, industrial track and siding be taken into account, it ranks first. Its main lines aggregate fully 12,200 miles, or slightly over twenty-one miles for every one hundred square miles of area. The problem of laying railroads has been comparatively simple; there have been no deep, sheer valleys to bridge, no mountains to tunnel through or elevated passes to cross—only comparatively level ground, which has not seriously taxed the energy and ingenuity of engineers. Chicago, the greatest railway center in the world, is the terminus of thirty-four railroads, whose length totals more than 60,000 miles; and there are in addition to these other great trunk lines which cross the state farther south and enter Saint Louis.

The excellent river transportation afforded by the Mississippi and its tributaries and by the Great Lakes has been referred to above. Chicago, the only Illinois port of entry, is the greatest of the world's lake ports (see CHICAGO). But there remain the canals—those waterways less appreciated to-day than formerly, but of great importance, nevertheless. The first canal problem was to connect Lake Michigan with the Illinois River, and this was accomplished in 1848 by the completion of the Illinois and Michigan Canal, which has its western end at La Salle. In 1907 there was finished the Hennepin Canal, which connects the Illinois River with the Mississippi.

Government. The present constitution of Illinois, the third in its history as a state, dates from 1870. Amendments may be proposed by two-thirds of each house of the general assembly, but do not become operative until ratified by the people at a general election. Not more than one amendment may be proposed at one session of the legislature, and the same article of the constitution may not be brought up for amendment oftener than once in four years. Amendment is thus rendered difficult, with the result that for a number of years there has been a demand for a convention to frame a new constitution.

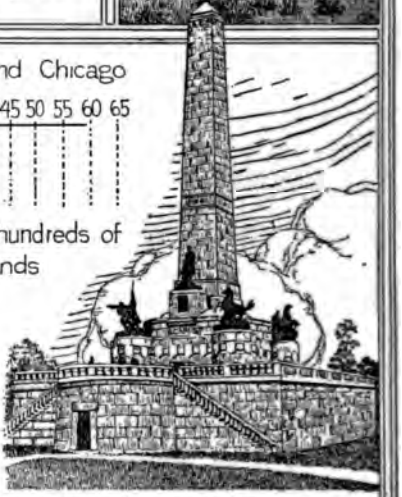
The *executive* department of the government consists of a governor, lieutenant-governor, secretary of state, auditor of public accounts, treasurer, superintendent of public instruction and attorney-general, all chosen by popular vote and holding office for four years, except the treasurer, who is elected for two years. He is not eligible for reëlection until two years after the expiration of his term.

The *legislative* department consists of a general assembly composed of two houses, a senate and a house of representatives. The senate has fifty-one members, one elected from each of the senatorial districts into which the state is divided, the term of office being four years. Each district also returns to the lower house three representatives, chosen for two years. The manner of voting for representatives, in accordance with the principles of minority representation, is especially interesting. Each voter has three votes, and he may distribute these among three candidates, give one and one-half votes to each of two, or cast them all for one candidate for whose election he is particularly anxious. This method of "cumulative voting," as it is called, has been adopted in few states, and is in disfavor, even in Illinois, as it frequently promotes the election of undesirable officials. The sessions of the legislature are biennial, and are held in the odd-numbered years. The governor holds the usual veto power, but a two-thirds vote of both houses makes a bill operative despite the governor's veto.

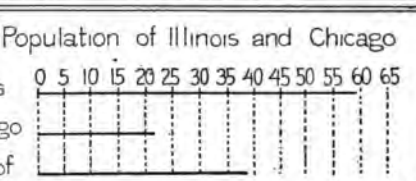
At the head of the *judicial* system is the supreme court, which consists of one judge from each of the seven judicial districts into which the state is divided. Their term is nine years. No decision may be given by the court in which four of the judges do not concur. The lower judicial bodies consist of circuit courts, appellate courts, county courts, and at the bottom of the list the justice courts, before which only petty cases are brought. Cook

ILLINOIS

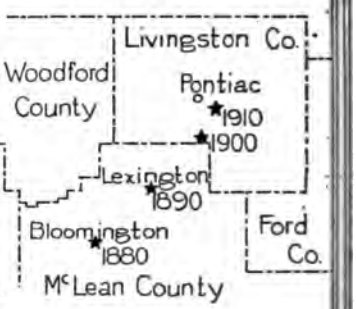
Library, University of Illinois

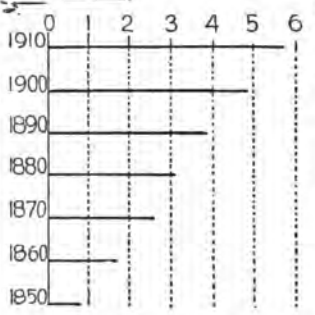


Lincoln's Monument, Springfield.

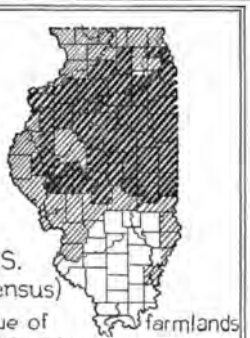


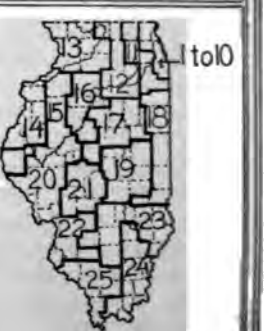
Starved Rock Illinois River





Growth of the population of Illinois by decades
Figures represent millions





Congressional Districts

County, with its great city of Chicago, constitutes one judicial district and has its own special municipal courts.

For special suffrage provisions, see subhead *History*.

History. *French Period.* Marquette, so far as is known, was the first white man to visit the territory comprising the present Illinois. In 1673 he made his way up the Illinois River with his canoes, and six years later La Salle further explored the same river, building near the present site of Peoria Fort Crevecoeur (Broken Heart). Fort Saint Louis was erected on Starved Rock, that natural vantage point above the river, in 1682, but not until 1700 was the first town in Illinois really founded. This was Kaskaskia. The Illinois Indians, for whom the state was named, were friendly, and the missions established among them met with considerable success. The whole section, which soon had many trading posts, was put under a French military commandant and made part of the territory of Louisiana.

Early National Period. The victories which in 1763 gave to the English Canada, also brought into their possession this territory, but little change was made, though the English did not understand as well as the French the method of dealing with the Indians. Even this frontier region was the scene of conflicts during the Revolutionary War, for in 1779 George Rogers Clark, in a series of engagements peculiarly thrilling, took Kaskaskia, and made the territory part of the new nation (see CLARK, GEORGE ROGERS). In 1787 it became a part of the Northwest Territory (which see), and in 1809 was organized as a separate territory, with its capital at Kaskaskia. Throughout all these early years there were constant troubles with the Indians, no longer friendly, and in 1812 occurred the famous massacre at Fort Dearborn (which see), on the site of Chicago. Before this date the titles to most of the land had been taken from the Indians, but it was not until two decades later that the Indians finally left the territory. On December 3, 1818, Illinois, with a population of about 50,000, was admitted to the Union as the twenty-first state.

Growth Toward Prosperity. For a time the Indian troubles continued and settlement in the north could not go forward, but after the Black Hawk War in 1832 (which see), the Sacs and Foxes removed across the Mississippi, and Illinois was free to develop more rapidly. Immigrants from the East and South flocked to the state, the latter with the determination to make of it slave territory, despite the direct prohibition of the Ordinance of 1787 (which see), and not until the time of the War of Secession did the bitter struggle between the slavery and anti-slavery parties really die out. Meanwhile economic development went on rapidly, railroads were built, the Illinois and Michigan Canal was begun in 1834, and great grain crops were harvested and sent out of the state over its numerous waterways.

A sharp clash took place soon after 1840 with the Mormons, who had settled at Nauvoo and acquired considerable political power. This culminated in the assassination of Joseph Smith, the founder and leader, in 1844, and in the next year the Mormons set out on their remarkable overland trip to Utah (see MORMONS).

In the years before the War of Secession Illinois attracted national attention chiefly because of the famous Lincoln-Douglas contest for the Senate, and during the War it furnished its full supply of troops—260,000 men in all.

Last Half-Century. The remarkable thing about Illinois in the decades following the War of Secession was its industrial development. Railroads multiplied so that their mileage was greater than that of any other state; mining advanced by rapid strides; grain was produced in ever-increasing quantities, and the "mushroom" city of Chicago acquired permanence as the largest grain and live-stock market of the country. Outstanding events in those years largely concerned Chicago; there was the great fire of 1871; the labor troubles of 1885 and 1886 which resulted in the anarchist riot in Haymarket Square; the World's Columbian Exposition of 1893; and the railway strike of 1894, which had its center at Pullman, just outside of Chicago, and was quelled only by the action of the Federal troops.

In politics Illinois had shown itself consistently Democratic in national politics up to the time of the War of Secession, but since that date it has been Republican except in 1892, when it cast its vote for Cleveland, and in 1912, when Wilson was its choice. Politically, Illinois has attracted considerable unfavorable attention in recent years, especially in connection with the election in May, 1909, of William Lorimer to a seat in the United States Senate. Almost immediately the method of his election was questioned, and charges of bribery were brought, but one investigating committee after another brought in

RESEARCH QUESTIONS ON ILLINOIS

(An outline suitable for Illinois will be found with the article "State.")

How does the name of the state and that of its largest city recall the early inhabitants of the territory?

How has the state shown its progressive character in dealing with the question of crime?

For what very important products does Illinois receive all the raw material from other states?

How does the state rank as a mineral producer?

Why is it so difficult to amend the constitution? What has this unusual difficulty led to?

What is the popular name for the state? What is the state flower?

Tell the story of Starved Rock. Of what influence in the development of the state has its location been?

What industry has the state of which the products for a single year are valued at more than the cost of the Panama Canal?

What was the first town ever established in Illinois? Had any previous attempt at settlement been made by the white men?

What are the limitations on woman's suffrage in Illinois, and what will be necessary before they can be removed?

Why was the southern part of the territory settled before the northern? What brought about the settlement of the northern regions?

What part of the state was described in a famous novel? How has much of the unpleasantness of the region been done away with?

Why has Illinois been able to introduce farm machinery more extensively than many of the other states?

What was the population of Illinois when it was admitted to the Union?

Why does not the statement that there are on an average 100.6 people to the square mile in Illinois convey a correct idea as to the density of population?

How has the course of an important river of the state been changed?

What specially important part did the chief river within the state play in its early history?

What is the chief agricultural industry in the vicinity of Chicago? What is the main crop in the state?

When did the last Indians leave the state? Was this before or after the founding of Chicago?

What is the ratio between the population of the largest city and that of the second largest of the state?

What lake is really not a lake?

Why has dairying been localized in the northern part of the state?

What part did a prominent religious sect play in the history of the state?

How many people out of each hundred, on the average, cannot read and write? What would be the difference if only American-born whites were considered?

What range of temperature is shown by the greatest extremes ever recorded within the state? Why are sudden changes of temperature frequent?

How does the state compare with other states as to railroad mileage? How does its greatest city compare with other cities as a railway center?

a report exonerating Lorimer. Finally, in July, 1912, after the discovery of additional evidence, he was deprived of his seat in the Senate, following an investigation in which the entire nation became deeply interested.

In the next year, 1913, the legislature passed a measure giving to women partial suffrage. They may vote for Presidential electors, for various municipal, county and township officers, and for university trustees, but only an amendment of the constitution can make possible complete woman's suffrage. At present they are deprived from voting for any officer whose place was created by the state constitution. An attempt was made to prove the measure unconstitutional, but the Supreme Court upheld it in 1914, and in that same year were held the first elections in which women participated. Their influence was most noticeable on questions concerning the liquor traffic. In 1917, fifty-three of the 102 counties of the state were under prohibition laws, besides which there existed township prohibition in many other sections. More than three-fourths of the state is without saloons.

Other Items of Interest. The first Indians that the original explorers met called themselves *Illini,* which meant *men,* to distinguish themselves from their enemies, whom they called beasts.

Despite the very considerable railway mileage of the state there is one county which has no railroads. This does not argue, however, that Calhoun County is unprogressive. It is a long, narrow "peninsula" between the Illinois and the Mississippi, and river transportation is sufficient for its needs.

All but the southern portion of the state was at one time covered with the great glacial ice sheet, and to this fact is due the level character of the land and the great fertility of the soil. The southern or non-glaciated area is very different in appearance from the northern part of the state, for its hills are rough and rocky instead of rounded, its rivers flow through miniature canyons, and its soil over the limestone rock is thin.

It is an interesting fact that this state, with its large output of steel and iron products, produces no iron ore.

"Chills and fever" constituted a dangerous enemy to many of the early settlers in the river districts, but sanitary drainage has practically overcome the danger of malaria. A.MC C.

Consult Mather's *The Making of Illinois;* Nida's *The Story of Illinois and Its People.*

Related Subjects. The reader is referred to the following articles in these volumes:

CITIES

Alton	Joliet
Aurora	Kankakee
Belleville	Kewanee
Bloomington	La Salle
Cairo	Lincoln
Canton	Mattoon
Centralia	Moline
Champaign	Monmouth
Chicago	Mount Vernon
Chicago Heights	Ottawa
Danville	Pekin
Decatur	Peoria
De Kalb	Quincy
East Saint Louis	Rockford
Elgin	Rock Island
Evanston	Springfield
Freeport	Streator
Galesburg	Urbana
Granite City	Waukegan
Jacksonville	

HISTORY

Black Hawk	Marquette, Jacques
Clark, George Rogers	Mormons
Illinois (Indians)	Ordinance of 1787
Joliet, Louis	Starved Rock

PRODUCTS AND INDUSTRIES

Coal	Oats
Corn	Petroleum
Dairying	Steel
Meat and Meat Packing	Wheat

RIVERS

Illinois	Rock
Mississippi	Wabash
Ohio	

UNCLASSIFIED

Chicago Drainage Canal	Michigan, Lake
	Ozark Mountains
Erie Canal	Prairie

ILLINOIS, the collective name of five distinct tribes of American Indians belonging to the Algonquian family. At one time they occupied the territory that is now included in the states of Illinois, Iowa, Michigan and Missouri. The Illinois tribes became the friends of La Salle during his explorations in the Mississippi Valley, and during the French and Indian Wars it was therefore natural that they should help the French. They regarded the advance of the English settlers with hostility, and were subdued only after many wars had been waged against them. Especially did they suffer in their conflict with the Ottawa Indians, who fought them to avenge the murder of Pontiac (which see). The remnant of the tribes, numbering about 200, lives on a reservation in Oklahoma. See INDIANS, AMERICAN.

ILLINOIS, UNIVERSITY OF, one of the largest and most important universities in the United

States, occupying a campus of about 1,200 acres, between the cities of Urbana and Champaign, which are located fifty miles northeast of the geographical center of the state.

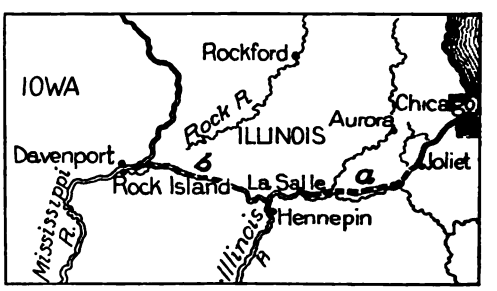
The university is the outgrowth of the Illinois Industrial University, founded in 1867, its present name having been adopted in 1885. Since 1870 women have been admitted as students and have maintained since that time an average of about one-fifth of the student body. The colleges of medicine and dentistry and the school of pharmacy are located in Chicago; all of the other departments are on the Urbana-Champaign campus. The latter comprise the colleges of liberal arts and sciences, agriculture, engineering, law and commerce, the schools of music and education and the library school. The graduate school has been in existence as an independent college since 1906.

There is a summer session of eight weeks, offering opportunities to teachers. In connection with the university are maintained the state laboratory of natural history, the state geological survey, the state water survey, the agricultural experiment station, the engineering experiment station, the Illinois historical survey and the coöperative investigation of Illinois coal problems and mine rescue station. The university has an adviser for foreign students, who makes the university as useful as possible to students from foreign lands. There is also a community adviser, who aims to bring the facilities of the university into the various communities of the state, assisting in the solution of community problems and aiding commercial organizations, women's clubs, churches, etc., in such ways as are possible. The high school visitor visits the high schools of the state for the purpose of determining the quality of their work and placing those that are satisfactory upon the accredited list of the university, making it possible for their graduates to enter the university without examination.

A generous system of scholarships is maintained, whereby students who win in competitive examinations have an opportunity to complete the regular courses without paying tuition. The university has an annual income of about $3,600,000. There are over 820 persons on its faculty, more than 760 of whom are connected with the Urbana-Champaign departments; of its more than 6,400 students (1917) about 550 are enrolled in the Chicago departments. The library has over 372,730 volumes, in addition to pamphlets, sheet music and 20,000 volumes of catalogs; in the library of the Chicago departments there are 20,520 volumes and 4,000 pamphlets.

Since 1914 the following buildings have been erected: an addition to the chemical laboratory, a stock-judging pavilion, an administration building, a new armory, a ceramics building, a vivarium, devoted to zoölogy and entomology, and a genetics building. The total value of these buildings is more than $1,000,000. Fifty-one of the sixty-four buildings owned by the university have a valuation exceeding $5,000 each. Under the able management of Edmund J. James, who became president of the university in 1904, the institution has made remarkable progress. V.V.P.

ILLINOIS AND MICHIGAN CANAL. In the year 1822 Congress granted to the state of Illinois the right of way for the construction of a canal to connect Lake Michigan by way of the south branch of the Chicago River with the Illinois River at La Salle. After several surveys and estimates, during which Chicago and Ottawa were founded, it was begun in 1836 and finished twelve years later, at a cost of over $6,000,000. The canal, which is ninety-six miles in length, has seventeen locks, each 110 feet long and eighteen feet wide, by means of which the drop of 145 feet from Lake Michigan to La Salle is accomplished. Boats of 150 tons can easily pass through the canal, for it is six feet deep and sixty feet wide at the bottom. For a time after the construction of railways it was little used, but recently it has been cleaned out and is employed to some extent for freight carrying.



ILLINOIS CANALS
(*a*) Illinois and Michigan Canal; (*b*) Hennepin Canal.

ILLINOIS RIVER, the largest river of the state of Illinois, and the most important, both from an industrial and an historic standpoint. It is formed by the union of the Des Plaines and Kankakee rivers, whose waters flow together about forty-five miles southwest of

Chicago. From this point the Illinois follows a diagonal course across the state, emptying into the Mississippi about fifty miles above Saint Louis. Its length is 500 miles, and it drains an area of 24,726 square miles, greater than that of the entire state of West Virginia. For long distances the stream cuts its way through bed rock, exposing ledges of limestone and coal layers. It was in the Illinois basin that Father Hennepin, in 1698, found the first coal discovered in America.

Steamers ascend the river as far as La Salle, 250 miles from its mouth, and at this point the Illinois and Michigan Canal (which see), ninety-six miles long, connects it with the south branch of the Chicago River. Eighty miles southwest of Chicago the Illinois is joined by the Fox River, and in the pioneer days all of the old trails from the southeast to the northern parts of the state crossed near their junction; the site is now occupied by the city of Ottawa. Peoria, the second city of Illinois in population, is situated on the west bank of the river, eighty miles southwest of Ottawa. At this point an expansion in the Illinois forms Peoria Lake. Near Beardstown, in Cass County, there are valuable fisheries. Other tributaries of the stream besides the Fox are the Vermilion, the Spoon, the Mackinaw and the Sangamon.

In the days of exploration and settlement the Illinois formed a part of the trail followed by the French explorers on their way from the Great Lakes to the Mississippi. At Starved Rock in La Salle County, one of the most picturesque features of the state, was built the first permanent French settlement north of the Gulf region, and the first fort in the region was erected by La Salle in 1680 on the south end of Peoria Lake.

Since the opening of the Chicago Drainage Canal (which see) the average level of the river has been raised, and in times of high water the lowlands along its banks are often submerged. The Illinois will be an important part of the waterway which it is proposed shall connect the Great Lakes with the Gulf of Mexico.

ILLITERACY, *il'it'er a si,* a term used to denote the inability of a person to read or to write in his own language. Methods of compiling statistics on illiteracy vary in different countries. As used in the United States census the term *illiterate* is applied to all persons ten years of age or over who cannot write. In Canada those persons five years of age or over who cannot read are illiterates. In some European countries the percentage of illiterates is ascertained by examining recruits for the army and navy, thus limiting the test to men of certain age. Classified statistics as to illiteracy have been collected by the United States Census Bureau at intervals of ten years since 1840, and similar statistics are published by other nations.

The percentage of illiteracy in a state or nation is, to a certain degree, an indication of the educational advantages provided for the people by the government. It is, however, difficult to obtain a fair basis of comparison because of the varying standards used. The most stringent laws regarding compulsory education prevail in the countries showing the smallest percentage. In the United States the proportion of illiterates remains large on account of the ignorance of the colored population and of some classes of immigrants.

The following table shows the percentage of illiteracy in the United States as a whole, by color or race, nativity and parentage:

CLASS	POPULATION	ILLITERATE	PCT.
White	63,933,870	3,184,633	5.0
Native	50,989,341	1,534,272	3.0
Native parentage	37,081,278	1,378,884	3.7
Foreign or mixed parentage	13,908,063	155,388	1.1
Foreign born	12,944,529	1,650,361	12.7
Negro	7,317,922	2,227.731	30.4
Indian	188,758	85,445	45.3
Chinese	68,924	10,891	15.8
Japanese	67,661	6,213	9.2
All other	3,135	1,250	39.9
United States	71,580,270	5,516,163	7.7

The illiteracy in each state, reported in the Federal census of 1910, is as follows:

	TOTAL	PER CT.
Alabama	352,710	22.9
Arizona	32,953	20.9
Arkansas	142,954	12.6
California	74,902	3.7
Colorado	23,780	3.7
Connecticut	53,665	6.0
Delaware	13,240	8.1
Florida	77,816	13.8
Georgia	389,775	20.7
Idaho	5,453	2.2
Illinois	168,294	3.7
Indiana	66,213	3.1
Iowa	29,889	1.7
Kansas	28,968	2.2
Kentucky	208,084	12.1
Louisiana	352,179	29.0
Maine	24,554	4.1
Maryland	73,397	7.2
Massachusetts	141,541	5.2
Michigan	74,800	3.3
Minnesota	49,336	3.0
Mississippi	290,235	22.4
Missouri	111,116	4.3

	TOTAL	PER CT.
Montana	14,457	4.8
Nebraska	18,009	1.9
Nevada	4,702	6.7
New Hampshire	16,386	4.6
New Jersey	113,502	5.6
New Mexico	48,697	20.2
New York	406,020	5.5
North Carolina	291,497	18.5
North Dakota	13,070	3.1
Ohio	124,774	3.2
Oklahoma	67,567	5.6
Oregon	10,504	1.9
Pennsylvania	354,290	5.9
Rhode Island	33,854	7.7
South Carolina	276,980	25.7
South Dakota	12,750	2.9
Tennessee	221,071	13.6
Texas	282,904	9.9
Utah	6,821	2.5
Vermont	10,806	3.7
Virginia	232,911	15.2
Washington	18,416	2.0
West Virginia	74,866	8.3
Wisconsin	57,769	3.2
Wyoming	3,874	3.3

The following table shows the percentage of illiterates in each of the Canadian provinces. The test is based on all persons five years of age and over who can neither read nor write.

	TOTAL POPULATION	PER CENT
Canada	7,206,643	10.50
Alberta	374,663	12.72
British Columbia	392,480	11.61
Manitoba	455,614	13.31
New Brunswick	351,889	14.05
Nova Scotia	492,338	10.34
Ontario	2,523,274	6.51
Prince Edward Island	93,728	7.61
Quebec	2,003,232	12.66
Saskatchewan	492,432	13.70
Yukon	8,512	13.58
Northwest Territories	18,481	69.25

The following table shows the percentage of illiterates in European countries:

COUNTRY	PER CENT	AGE BASIS	YEAR
Austria	26.3	Population over 10 yrs.	1900
Belgium	12.7	Population over 10 yrs.	1910
Bulgaria	65.5	Population over 10 yrs.	1905
Denmark	0.2	Army Recruits	1907
England	1.8	Marriages	1910
France	14.1	Population over 10 yrs.	1906
Germany	0.02	Army Recruits	1908
Greece	57.2	Population over 10 yrs.	1907
Hungary	63.3	Population over 6 yrs.	1910
Ireland	9.2	Population over 9 yrs.	1911
Italy	37.0	Population over 10 yrs.	1911
Netherlands	0.8	Army Recruits	1912
Portugal	68.9	Population over 10 yrs.	1911
Rumania	61.2	Population over 7 yrs.	1909
Russia	70.0	Population over 10 yrs.	1897
Spain	58.7	Population over 10 yrs.	1900
Sweden	0.2	Army Recruits	1911
Switzerland	0.3	Army Recruits	1911
United K'gd'm.	1.0	Army Recruits	1904

ILOILO, *e lo e'lo,* the capital of the province of Iloilo, on the island of Panay, and next to Manila the city of greatest commercial importance in the Philippine Islands. It has a fortified harbor and is the center of trade of the province; the exports are tobacco, rice, sugar, hemp, coffee, dyewoods and cotton. The chief manufacturing industry is that of textiles, such as the weaving of fabrics of *pina,* or pineapple fiber. Deposits of iron and gold are also found, and there are extensive forests and stone quarries. At the close of the Spanish-American War in 1898 the natives resisted American authority, and in 1899 the insurgents fired on the *Petrel* and *Baltimore,* the United States gunboats. Iloilo was then bombarded and taken by United States troops, and in 1901 civil government and good order were established. Population of the city, about 60,000; of the province, about 415,000.

IMAGINATION, *im aj i na'shun.* The Bible tells us that "where there is no vision the people perish," and Napoleon, at the height of his career, said, "Imagination rules the world." Imagination is the great index finger of civilization that has pointed out the pathway of progress through the ages. It carved the Sphinx, reared the Pyramids and the temples of the Nile; it created the Parthenon, the Apollo Belvidere and the Venus de Milo; it "rounded Saint Peter's dome" and spread upon the walls of San Sisto the *Sistine Madonna,* a vision of heavenly love for all time. Later it gave the world the suspension bridge, the steel arch, the printing press, the steamboat, the locomotive, the telegraph, the telephone, the electric car, the automobile and the aëroplane to bind together the nations of the earth. It has given us the sewing machine, the vacuum cleaner, the cream separator, the reaping machine, and untold other inventions for the benefit of city and country, lightening the burdens and contributing to the culture and refinement of the industrial world.

The works of the great composers—Handel's *Messiah,* Wagner's *Parsifal* and the symphonies of Beethoven—are all works of the imagination. All the great works of literature from the *Iliad* of Homer to modern times; *Paradise Lost, Faust,* the *Divine Comedy, Hamlet, Macbeth* and all the other great dramas are products of this power of the mind. Says Shakespeare:

> And as imagination bodies forth
> The forms of things unknown, the poet's pen
> Turns them to shapes and gives to airy nothing
> A local habitation and a name.

What the Imagination Is. It is easier to tell what the imagination does than to tell what it is. Many definitions have been given and some of them seem to convey opposite meanings. One school of psychologists considers memory to be a form of imagination. The followers of this school call memory the *reproductive* imagination, and what is ordinarily considered imagination, the *constructive* or *creative* imagination. However, the most recent authorities consider these activities of the mind as distinct. We may say then that imagination is that form of mental activity which constructs mental images different from those actually experienced. Memory recalls images of past experiences as they occurred; imagination projects our ideas and experiences into the future in modified form, the form which we wish them to take. The office clerk on a small salary sits in his lonely room and constructs a future in which he sees himself as a wealthy man owning a large business and a beautiful home, and the vision is so clear that then and there he resolves to become wealthy and influential. From that time on he leads a life devoted to a definite purpose. The schoolboy sees himself as a college student and puts forth his effort in preparation for entrance to the school of higher grade, and so on. It is through the imagination that we form our ideals or project ourselves into the future. When these ideals are adopted we put forth our efforts to attain to them; hence imagination is the power that leads one or makes one progressive.

Many who do not realize what the imagination does consider it merely as the power of fancy and hallucination. Nothing could be further from the truth. To be sure it is through this activity of the mind that we derive our fancies and daydreams, and the child creates the world of myths in which he largely lives, but the imagination grows as the mind develops and soon leaves the world of myths and dreams for that of realities. We should regard the imagination as one of our most precious possessions.

Childhood. Early in life the child begins to combine his experiences into original mental products. He weaves his world of fancy and happily dwells therein, although it often differs widely from the world of reality. The stick becomes a horse, a bundle of rags a baby, and blocks and papers may form a collection of wild and domestic animals. From the third to about the eighth year, myths and fairy tales afford the greatest enjoyment because they harmonize so closely with the child's mythical world. To him at this time these myths are more true than the actual facts discerned by his elders. The child's craving for myths and fairy tales should be satisfied, both for his present and his future good. These tales embody for him the greatest truth. Moreover, without a knowledge of folklore he cannot in after years comprehend the best in literature and art. "The language that Homer and Virgil and Spenser and Shakespeare and Dante and scores of others of the past have spoken is jargon to him who has no understanding of the simpler, obscure and forgotten masters, who in the folklore of the people of all times have left a world of rarest story for the children of ages yet unborn."

Because of their limited knowledge and experience children often make exaggerated statements or statements which have no foundation of fact. Those unacquainted with child psychology are prone to regard such statements as falsehoods and to brand children as "little liars." This is a gross error. The child describes the mental pictures his imagination creates. These pictures are real to him, and in his narrations he has no thought of misrepresentation. It does not follow, however, that children should be left without guidance in the development of the imagination. Unless the child is led to correct his mental pictures as he gains in experience and to use reason and common sense in the exercise of his imagination, the habit of exaggerating may become so firmly fixed that he cannot break it off. Such a one in due time becomes a "professional liar." At the age of twelve the child should have his imagination so trained that he can construct mental pictures which conform to existing facts, that is, he should be able to give accurate and reasonably complete descriptions of what he has read or what is told to him.

Maturity. The products of the imagination may be divided into two classes, the real and the unreal. The mature mind has its flights of fancy and all are given more or less to daydreaming and "building castles in Spain." This dreaming is natural, and unless carried to excess, beneficial, for it is a means of fashioning our ideals. The imagination of a well-balanced mind, however, is employed in creating the real. In this way we use our imagination in business, in invention and scientific discovery, in developing systems of government and

in the thousand and one ways which contribute to the welfare of the individual and the progress of society.

There are two classes of ideas which should be carefully distinguished—those that will always remain unreal and those that may become real. For instance, we may join the body of a woman to the tail of a fish and create the image of a mermaid, but we do not believe that such a being exists, or ever will exist, because the combination of elements forming the picture is contrary to all known laws and because no such object has been seen. On the other hand, many inventions when first projected are pronounced "mere figments of the brain" and considered impracticable, but experience has proved most of these inventions to be practical and useful, and many of them have been so interwoven into the industrial and social life of the world that they are now indispensable. Such are the telegraph and the electric light. Those who give undue attention to the creation of the unreal are seldom successful in practical affairs, but their creations are sometimes of great value to the world. Should we withdraw from literature the works of Shakespeare, Milton, Victor Hugo, Dante, Longfellow, Lowell, Hawthorne, and scores of others, the race would suffer an irreparable loss, and the same may be said of the great works in music and art.

It is not only in the realm of the material that the imagination enables us to make progress. Imagination working with reason has enabled men to think out and set in order the laws that govern the nations of the earth, to find practical application for those universal principles—truth, love, justice, freedom—that lie at the foundation of character. This is why the works of Plato, Kant and other great philosophers will last through all time.

Imagination makes us happy or miserable. Fear and worry are but results of imagining conditions which we anticipate, and the anticipation is usually stronger than the reality. This may also be true of our anticipation of pleasure, though a slight disappointment in the reality brings us no harm. It naturally follows that a clear conscience and clean thinking are important factors in the production of our mental images.

"Thyself within! Thyself within!
O friend! find here thy strength, thy peace,
Pray not that loss and change may cease—
Pray rather, higher heights to win!
Thy spirit Godward wins release,
And soar thee where thou art akin!"

Culture of the Imagination. Because of its nature imagination is more likely to be abused than any other form of mental activity. Unless it is curbed by the reason it is liable to run away with us. All other activities of the mind aid in giving culture to the imagination. Therefore he has the most useful imagination whose mind has been so trained that all its activities are harmoniously developed. The following suggestion will be found helpful to those interested in the mental training of children:

1. The products of the imagination can contain nothing that is not previously in the mind. Observation (perception) then is the first step in the culture of the imagination.

2. Ideals depend largely upon one's association and environment. Not only is it true that "evil associates corrupt good manners," they also create thoughts and mental pictures that no pure mind can entertain. See that children are placed amid suitable surroundings.

3. Literature exerts a powerful influence upon the imagination. Tell stories and read books to children that convey their own moral without comment, and in that way aid in the formation of high ideals.

4. Play is actuated by and gives culture to the imagination. Children should have opportunity to play and should be taught good games (see PLAY; GAMES AND PLAYS).

5. Within the limits of their mental capacity children should be encouraged to construct and invent. Oral and written composition are among the best means of giving culture to the imagination. Encourage pupils to put as much life and beauty as they can into their recitations in language, reading, geography and history. Discuss with them the books they read and encourage them to describe the leading characters and to tell why they like or dislike them.

6. Remember that the imagination is a practical activity and that it is associated with every complete mental act.

7. Ideals are progressive, and that they may be effective they must be tangible, that is, within the grasp of the child's understanding, otherwise he will find no interest in them. When the ideal is chosen the teacher and parents should see that it progresses as the child gains in experience.

See PERCEPTION; MEMORY; FEELING. W.F.R.

IMMIGRATION. See EMIGRATION AND IMMIGRATION.

IMMORTALITY, *im mawr tal'iti,* a continuation of existence, in some form, after the dissolution of the body; the doctrine that the human soul survives the death of the body, and exists forever. Belief in immortality, in some form, has been a part of almost all religions. Life after death was believed by the ancient Greeks and Romans to be a shadow of the present, and the spirits of the dead were supposed to inhabit the invisible world as

shadowy forms. Among other people it is believed that the mind and soul improve and develop after the death of the body. With most nations the belief in immortality is as fixed as the belief in a God; in fact, the two beliefs are closely associated in the minds of most men. Joseph Addison, in *Cato,* says:

It must be so,—Plato, thou reasonest well!
Else whence this pleasing hope, this fond desire,
This longing after immortality?
Or whence this secret dread and inward horror
Of falling into naught? Why shrinks the soul
Back on herself, and startles at destruction?
'Tis the divinity that stirs within us;
'Tis Heaven itself that points out an hereafter,
And intimates eternity to man.
Eternity! thou pleasing, dreadful thought!

IMMORTELLE, *im or tel',* from the French word *immortel,* meaning *immortal,* is the term applied to various species of *helichrysum,* which is grown extensively in France, where the flowers are made into wreaths and sometimes dyed. Their principal use is for funeral decorations, either in their natural yellow color, or bleached white. The chief characteristic of the immortelle is that which suggested its name; the flowers retain their natural color indefinitely, and are therefore called *everlasting.*

IMMU'NITY, derived from the Latin *in* and *munus,* meaning *not serving,* is exemption from duty or service. In law, immunity is an exemption from serving in an office or performing duties required of other citizens. Immunity also refers to the condition of an individual who is not susceptible to certain diseases. Immunity in persons and animals may be either *natural* or *acquired.* Natural immunity is possessed by certain persons, families, races and animal species. Horses, cats and dogs are naturally immune from tuberculosis. The Arab is said to be immune from typhoid fever. Acquired immunity is a condition resulting from a previous attack of a disease or from innoculation.

IMPEACHMENT, *im peech' ment.* In English and American law, a government official is impeached when an authorized legislative body calls him to account for conduct unworthy of his office, and requires him to defend himself against the charges. An impeachment is an *accusation* only, presented in legal form, and it does not necessarily imply that the accused is guilty. In England the House of Commons makes the accusation, and the House of Lords is the court which tries the case. The most famous impeachment trial in English history was that of Warren Hastings (which see), the proceedings in this case lasting eight years. Impeachment in England is now practically obsolete. The British North America Act, the constitution of the Dominion of Canada, provides that judges of the superior courts may be removed by the Crown as a result of successful impeachment by the Dominion Parliament.

In the United States, officers of the states are impeached by the lower house of the state legislature and are tried by the upper chamber, the Senate. When an officer of the United States government is impeached the accusation must be voted by the House of Representatives. The Senate becomes the court of trial, with the Vice-President of the United States as presiding officer, except when the President is tried. The Constitution provides that the Chief Justice of the Supreme Court shall preside at the trial when a President is impeached, as the Vice-President, who would succeed to the office in case of conviction, might not be able to preside without prejudice. The vote of the Senate is taken by putting the question separately to each member, a majority of two-thirds of those present being required for a conviction.

An officer found guilty under impeachment charges may be removed from office and disqualified from holding any other office of honor, trust or profit under the United States. Impeachment proceedings simply determine a man's fitness to continue in his position of trust; further punishment must be meted out by a regular court of law.

Ten times in the history of the United States has the House of Representatives voted articles of impeachment:

(1) William Blount, senator from Tennessee, was impeached on July 7, 1797, for conspiring to wage war with Spain in favor of Great Britain, and for attempting to stir up the Cherokee Indians against Spain and the United States. His trial lasted from December 17, 1798, to January 14, 1799, and resulted in his acquittal.

(2) John Pickering of New Hampshire, judge of the United States District Court, was impeached in 1803 for drunkenness and profanity on the bench, and for unlawful decisions. He was found guilty on all counts and removed from office.

(3) Samuel Chase, associate judge of the Supreme Court of the United States, was impeached in 1804 for injudicious actions and decisions in several political trials. He was acquitted in March, 1805.

(4) James Peck of Missouri, judge of the United States District Court, was impeached in 1830 for arbitrary conduct while trying a case. In January, 1831, he was acquitted.

(5) West H. Humphreys of Tennessee, judge of the District Court of the United States, was impeached in 1862 for giving support to the secession movement and unlawfully acting as judge of the Confederate District Court. He was found guilty and removed from office.

(6) Andrew Johnson, President of the United States, was impeached in 1868 for violating the Tenure of Office Act, for corrupt use of the veto power, interference at elections and other high crimes and misdemeanors. His case came to trial on March 30 and ended on May 26. Thirty-five senators voted him guilty, nineteen declared for his acquittal. The vote lacked one of a sufficient number to convict, and he was therefore acquitted.

(7) William W. Belknap, Secretary of War of the United States, was impeached in 1876 for accepting bribes. He was acquitted.

(8) Charles Swayne of Florida, judge of the District Court of the United States, was impeached in 1905 for misconduct in office. He was acquitted.

(9) Robert W. Archbald, associate judge of the United States Commerce Court, was impeached in 1912 for entering into corrupt alliances with coal-mine owners and railroad officials while in office. In January, 1913, he was found guilty and removed from office.

(10) On June 12, 1914, District Judge Alston G. Dayton of West Virginia was impeached. Proceedings were dropped without trial, March 15, 1915.

Jurists of wisdom and experience recognize the benefits arising from prosecutions of this nature. Men who are high in position, influence and authority are sometimes brought to justice in no other way. Furthermore, the solemn nature of the proceedings, the wide public attention they receive, the far-reaching effect of the verdict—whether it proclaims the innocence of the accused or places him before the people as one faithless to the trust imposed in him—all tend to make a lasting impression on the public mind. E.D.F.

IMPERATOR, *im pe ra' tor,* a Latin word from which the modern title *emperor* is derived; it means *commander,* or *leader.* The Romans gave the title to certain magistrates and to victorious military commanders. During the days of the republic the title carried with it no suggestion of imperial power. Julius Caesar used it continuously for some years previous to his death, and his nephew Caesar Augustus made *imperator* synonymous with emperor. The sovereigns of Britain, as emperors of India, cause the letters R. I. (Rex Imperator) to be stamped on all British coins, and the king signs the letters after his name on all official documents, as *George R. I.*

IMPERIALISM, *im pe' ri al i'zm,* in modern politics, a term applied to a governmental policy which results in the establishment of political ties and expansion of territory by a country beyond its own borders. In the United States it has been a debated issue, as each acquisition of new territory outside of the continental limits has met with much opposition from so-called "anti-imperialists." At the close of the Spanish-American War "imperialistic" policies were debated with much vigor; the acquisition of Porto Rico and the Philippine Islands aroused the protest of many on the ground that it was tending toward imperialism, a word formerly used only to mean the policy and character of an empire which sought territorial extension over the globe. On December 2, 1901, the Supreme Court decided that a limited imperialism, which aims at improvement, education and advancement of the population was within the scope of the national government. The leading country in territorial expansion has been Great Britain, but Germany was particularly active in this respect after the formation of the Empire in 1871.

IMPRESSIONIST, *im presh' un ist,* **SCHOOL OF PAINTING,** the name given to a modern school of art, which originated in France. Its followers seek to avoid the rules of composition, lighting, etc., which have been accepted by the art of the past. On the contrary, they seek to portray, with absolute truth, their personal and first-hand "impressions" of nature. In the works of most of the impressionists little care is shown in the selection of subject, nor is there much regard evinced for beauty of color, form or expression. Edouard Manet is regarded as the founder of the school, of which Claude Monet, Degas, Renoir and Pissaro are among the best-known disciples. The followers of the new tendency in art, known as post-impressionists, cubists and futurists, are members of this school. See CUBIST SCHOOL OF PAINTING.

IMPRISONMENT FOR DEBT. See subhead, in article DEBT.

INCA, *ing' ka,* the name of a wonderful family of Peruvian Indians, believed by some to have been a royal caste or family, powerful at the time of Spain's conquest of the South American continent. The war chief of the tribe was called "the Inca;" this office was not inherited, but was usually filled by selection. The tribal dialect was called *Quichua.* When Huayna Capac ascended the throne of the Incas in 1475, the empire reached its summit of splendor. Its government was the strongest and finest in South America.

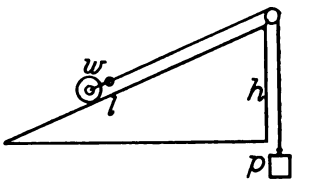
The Incas were expert farmers who irrigated their lands, erected large granaries and built good roads to all parts of their empire. Their windowless houses were built of sun-burned bricks or granite, and were about eight feet high. They owned great quantities of gold, which was used lavishly in the decoration of their palaces and temples. The capital of the empire was at Cuzco, but Atahualpa moved it to Quito, just before the arrival of Pizarro, to secure himself against attack by his brother, who started a rebellion (see ATAHUALPA).

The Incas were conquered by the Spaniards in 1523, but they were not exterminated, and their descendants are now civilized, respected inhabitants of Peru. The largest and most important Inca ruin discovered in South America since the days of the Spanish conquest is Machu Picchu, which was found in 1911 by Peruvian expeditions. The ruins of buildings made of blocks of granite beautifully fitted together represent the most refined style of Inca architecture. Explorers believe that Machu Picchu may prove to be Tampu Tocco, the mythical place from which the Incas came when they started out to found Cuzco and to build the foundation of their great empire.

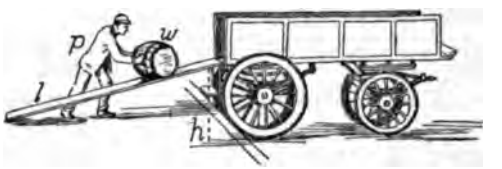
Consult Henty's *Treasure of the Incas.*

INCENSE, *in'sens,* a substance made from resins, sweet-smelling gums, balsams and similar ingredients, which, when burned, gives off a delicate fragrance. Among the ancient Jews the burning of incense was considered an act of worship, and as early as 340 (and probably long before) it was a feature of Roman Catholic communion service. Even now it is used in Catholic burial rites and at high mass, as well as in the communion services of some Episcopal churches. The powdered incense, poured into a metal vessel, the censer, containing burning charcoal, is melted by the heat, and it emits a sweet perfume and a bluish, vapory haze. The censer, suspended by chains, is swung, either by the priest or by an attendant, about the altar or sanctuary. There are many references to incense in the Bible. In very early times the peoples of the Far East burned it when worshiping their gods, a custom which is still common among Buddhists.

INCLINED, *in klyned',* **PLANE.** A merchant wished to load a barrel of molasses weighing 200 pounds into a wagon three and one-half feet high. He took a plank fourteen feet long, placed one end on the wagon and the other end on the ground, then rolled the barrel up the plank. By this device he was able to load the barrel by lifting only fifty pounds. The plank was what in physics is called an *inclined plane,* and its practical use is for lifting heavy weights. The load to be lifted is called the *weight;* the force required to move it is the *power.* The law of the inclined plane is: The power multiplied by the length of the plane equals the weight multiplied by the height. In the example given above, $14\times50=200\times3\frac{1}{2}$. In the illustrations l represents the length, h the height, w the weight and p the power. A carriage road winding up a hillside and a section of a railroad constructed on a grade are good examples of an inclined plane on a large scale.



INCLINED PLANE



PRACTICAL APPLICATION

IN'COME TAX, a tax levied by a national government on incomes. It may be collected from individuals or firms actually receiving the income, or it may be deducted "at the source," that is, the persons or firms who provide the income may deduct the tax from salary, interest, rent or other items they pay out. Such a tax may be *uniform,* in which case it is a fixed percentage on all incomes, or it may be *graduated,* that is, made relatively greater for large incomes than for small ones.

In nearly all countries which employ the income tax it is customary to exempt from taxation all incomes below a certain amount. The theory of such exemptions is that a certain income is necessary to existence or to the maintenance of a standard of living; in either case this minimum should be exempt because a tax would mean that the state would have to repay the tax in the form of relief for the poor or else would lower the standard of living. Both of these results would be undesirable. Some economists believe, moreover, that earned income should be treated differently from income derived from property or inherited. If the income is derived from in-

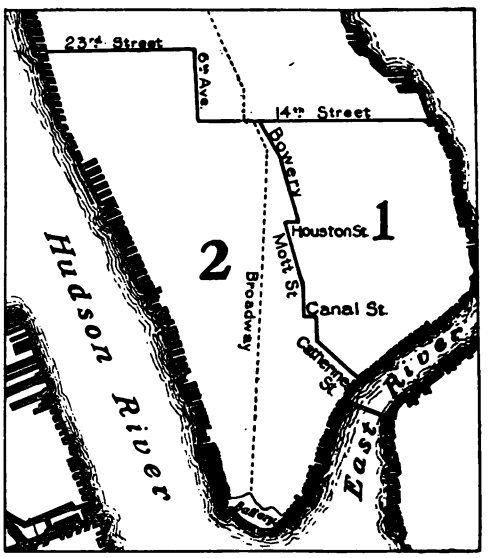
vestments or from inherited wealth the tax should be larger, they say, than if a man really works for a salary or manages his own business, because in the latter case the income ends with one's working life.

Although a limited form of income tax was in force in England for a few years in the middle of the fifteenth century, this form of taxation is distinctly a nineteenth century device. It was first used by England during the Napoleonic wars, soon after 1800, when the nation's huge expenditures made new sources of revenue necessary. It continued in force as a war measure until 1815, but in 1842 it was revived and has since been a fixed feature of the English fiscal system. Soon after the outbreak of the War of the Nations in 1914 the British income tax was greatly increased, especially on the largest incomes; this was one of the quickest and surest methods of increasing the government's revenue. In other European countries, in Austria, Germany, Italy, Switzerland and elsewhere, income taxes are also in force. In Canada taxation of incomes has not yet been resorted to. In all there are about fifty countries or states, having a population of nearly 700,000,000, which tax incomes.

Tax on Corporations. All corporations, joint-stock companies and associations, not including partnerships, are also required to pay a tax on their net incomes from all sources. If, however, the corporation is organized under the laws of a foreign country it is required to pay a tax only on that part of its income from its home operations—one per cent of the net income. It should be noted, however, that labor and agricultural organizations are exempt from taxation, as are also fraternal and benefit societies, building and loan associations, chambers of commerce and boards of trade, and any organizations conducted solely for charitable, scientific or educational purposes.

In the United States. In the United States as early as 1812 the Secretary of the Treasury advocated a Federal tax as a war measure, but his advice was not heeded. In 1862 Congress passed an income tax law which remained in force until 1872, and yielded a total of $376,150,204. It was not very satisfactory in its operation, and no further attempt was made to tax incomes until 1894. The income tax law of that year was declared unconstitutional by the Supreme Court of the United States on the ground that it was a direct tax, and was not divided among the states according to population, as required by the Constitution.

The desirability of a Federal income tax, however, was slowly becoming recognized, and a movement arose to amend the Constitution so that tax need not be proportioned among the states according to population. This amend-



WHERE EXTREMES MEET

The map represents the lower portion of New York City. The two divisions shown are Federal districts for collection of income and corporation taxes. The second district is the richest region in the world—two square miles in which about 15,000 persons normally have incomes exceeding a billion dollars. From here the government collects more than one-fourth of its total income tax and nearly one-fifth of its corporation tax. The first district is the most populous spot in America, and possibly in the world; it contains the famous "East Side," or the Ghetto, and it contributes practically nothing to either tax.

ment—the Sixteenth—was submitted by Congress to the states in 1909 and was declared ratified in 1913. It was phrased as follows:

> The Congress shall have power to lay and collect taxes on incomes, from whatever source derived, without apportionment among the several States, and without regard to any census or enumeration.

The way then being clear, an income tax was incorporated in the Underwood-Simmons tariff law of 1913.

Provisions of the Law of 1913. This law provided a tax on all incomes over $3,000, for an unmarried person, and over $4,000, for a husband and wife living together. Thus, a married man earning $4,000 a year is exempt from taxation, but a single man earning the same salary must pay a tax on $1,000. All incomes over and above this exemption of $3,000 or $4,000, and up to $20,000, are taxed at the rate of one per cent; this is called the *normal* tax. All incomes over $20,000 pay an

additional tax, or *sur-tax*, the rate of which depends on the income. On that part of the income over $20,000 and under $50,000, the additional tax is one per cent. In other words, if a married man's income is $48,000 a year he pays no taxes on $4,000, pays one per cent on $44,000 ($48,000 minus $4,000), and one per cent extra on $28,000 ($48,000 minus $20,000); he therefore pays $440 plus $280, or $720.

The larger the income the greater is the additional tax. In addition to the normal tax of one per cent, a two per cent tax is levied on that part of the income in excess of $50,000 but under $250,000; five per cent on that part over excess of $75,000 but under $100,000; four per cent on that part in excess of $100,000 but under $250,000; five per cent on that part over $250,000 but under $500,000; and six per cent on any part exceeding $500,000.

This complicated system makes it difficult, at first glance, to figure the tax which a wealthy man must pay. A simple example, however, will make it clear. Let it be supposed that a certain married man has an income of $550,000; he could figure his total tax as follows:

INCOME	TAX RATE	TAX
Exemption, $4,000	None	None
$550,000 less $4,000	One per cent	$ 5,460.00
Over $ 20,000 and under $ 50,000	One per cent additional	300.00
Over 50,000 and under 75,000	Two per cent additional	500.00
Over 75,000 and under 100,000	Three per cent additional	750.00
Over 100,000 and under 250,000	Four per cent additional	6,000.00
Over 250,000 and under 500,000	Five per cent additional	12,500.00
Over 500,000	Six per cent additional	3,000.00
Total Tax		$28,510.00

He might also figure it in this way:

INCOME	TAX RATE	TAX
Exemption $4,000	None	None
$ 4,000 to $ 20,000	One per cent.	$ 160.00
20,000 to 50,000	Two per cent.	600.00
50,000 to 75,000	Three per cent	750.00
75,000 to 100,000	Four per cent.	1,000.00
100,000 to 250,000	Five per cent.	7,500.00
250,000 to 500,000	Six per cent.	15,000.00
Over $500,000	Seven per cent	3,500.00
		$28,510.00

The income tax is collected, so far as possible, at the source. The employer may pay the tax for the employee, by deducting it from his salary and paying it direct to the internal revenue collector; the mortgagor for the mortgagee; the trustee for his ward. In every case, however, the receiver of a taxable income must file with the collector of internal revenue a sworn statement showing the sources of income and any exemptions or deductions allowed by law. This statement must be filed by March 1 of each year, and the tax is assessed on the income for the preceding calendar year. Failure to make a schedule is punishable by a fine of from $20 to $1,000, and making a fraudulent schedule is punishable by a fine of $2,000 or imprisonment for one year, or both. See INTERNAL REVENUE.

State Income Taxes. At different times a number of American states have made experiments in the direction of taxing incomes, but the returns were small and the results unsatisfactory until 1911, when the state of Wisconsin adopted a system of income taxation. As administered by an efficient expert state tax commission, this tax yielded in the four years between 1912 and 1916, $7,475,912. E.A.R.

Consult Seligman's *The Income Tax;* Foote and Tracewell's *Analysis and Interpretation of the Federal Income Tax Law;* Hill's *The British Income Tax.*

INCUBATOR, *in'ku ba tor.* When large flocks of chickens, geese or ducks are desired, the most simple and economical way is to hatch the eggs artificially; that is, to place them in a machine called an *incubator,* especially built and prepared for the purpose. This machine looks much like a square wooden table, with two drawers and a small lamp or heater attached to one side. Within are two trays: the upper one, which is several inches shorter than the lower, is used for the eggs, while the lower one is for the little chicks to stay in, while drying, the first day after they are hatched. As soon as the chick hatches it goes towards the light, which comes in from a glass door at the front of the incubator, and when it reaches the edge of the egg tray it falls to the lower compartment. The eggs of hens require three weeks to hatch, while those of geese and ducks require four weeks.

Great care in regulating the heat and ventilation, both inside and outside of the incubator, is essential to success in hatching a large brood.

A uniform temperature of 102° around the trays should be maintained for the first two days after the eggs are laid on the tray, and this should be raised to 103° for the rest of the time. The eggs must be turned each day until two days before the time to hatch. The incubator should be placed in a room free from drafts and dampness, and be kept as free as possible from jars.

Recently incubators for babies have been used to some extent to save the lives of weak or poorly-developed little ones, who would die because of their premature birth if exposed to the air in an ordinary room.

INDEPENDENCE, *in de pen' dens,* KAN., a distributing point for a rich agricultural section and the county seat of Montgomery County, situated on the Verdigris River, in the southeastern part of the state, sixteen miles from its southern border line. Pittsburg is sixty miles northeast. The Atchison, Topeka & Santa Fe, constructed to the city in 1872; the Missouri Pacific, built here in 1886; and the Union Traction Interurban Line, built in 1907, serve the city. The population increased from 10,480 in 1910 to 14,506 in 1916; the latter figure is a Federal estimate. Independence was settled in 1869, was incorporated in 1871 and adopted the commission form of government with three elective officers in 1909. The area of the city exceeds two square miles.

The vicinity of Independence abounds in natural gas and oil wells, and the headquarters of several oil and natural gas companies are located here. The industrial establishments include oil refineries, planing, flour and cotton mills, cracker and sugar factories, glass works, machine shops and vitrified brick, rubber, Portland cement and asphalt plants. The city has a $75,000 Federal building, constructed in 1913; the Booth Hotel, built in 1912 at a cost of over $150,000; the Elks' Home, a high school, a commercial college and a Carnegie Library. Riverside Park, covering eighty-seven acres, is the largest of the city's recreation grounds.

INDEPENDENCE, MO., the county seat of Jackson County, and a suburb about ten miles east of Kansas City, with which it is connected by an electric line and a boulevard. It is three miles south of the Missouri River and is on the Chicago & Alton, the Missouri Pacific and the Kansas City Southern railroads. Its area exceeds three square miles. The population, which in 1910 was 9,859, was 11,672 in 1916, by a Federal estimate.

Prominent features of the city are the courthouse, located in a small public square; a Federal building; a public library, several sanitariums and Saint Mary's Academy. Independence is surrounded by a fertile agricultural and fruit-growing country. The city is an important stock-breeding center, and has large flour mills, a canning factory, a planing mill, a foundry, an oil refinery, scale works and plants manufacturing Portland cement, silos, gas engines, bricks and overalls.

Independence was settled, incorporated and chosen as the county seat in 1827. It was first chartered as a city in 1849, and in 1889 was organized as a city of the third class. The place was at one time (prior to 1844, when a flood destroyed the river landing) an outfitting and departing station for the great westward-bound trains of prairie schooners. In 1831-1832 about 1,500 Mormons came to Independence, and in spite of various misfortunes many of this faith still live here, believing the city to be a future Zion. C.C.B.

INDEPENDENCE DAY, the national holiday of the American people, commemorating the birth of their nation. It is the anniversary of the adoption of the Declaration of Independence, which occurred on July 4, 1776. Strange as it may seem, the Fourth of July is not a national legal holiday, for no legislation declaring it to be such has ever been enacted by Congress. However, it is celebrated throughout the Union, and in all the states but Kansas, Kentucky, Mississippi and South Carolina it has been designated a legal holiday by statute. In these four states it is observed as a holiday by general consent.

For many years the people were accustomed to celebrate this day of national rejoicing by spectacular displays of fireworks, and by firing of cannon, pistols, firecrackers and other instruments of noise. In many homes the day has been an occasion of sorrow, for this mode of commemoration has caused loss of life and serious injuries. A great national crusade has worked a reform in this matter, and now a "sane" Fourth prevails quite generally throughout the country. Interesting programs, providing for special speakers, for pageants, games and plays, athletic contests and the like, are enjoyed in most communities. On Independence Day the Stars and Stripes may be seen floating on public buildings and homes throughout the land.

John Quincy Adams wrote these eloquent words concerning the national holiday:

RING, RING FOR LIBERTY

Independence Day

SUGGESTIVE PROGRAMS

1

Hail, Independence, hail! Heaven's next best gift
To that of life and an immortal soul!
Thomson

Song, *America*
Essay, *The Story of the Declaration of Independence*
Reading of the Declaration
The Rising in 1776.....*Read*
Essay, *What Is True Patriotism?*
Concord Hymn.....*Emerson*
The Battle of Lexington.....*Lanier*
Essay, *Why I Love My Country*
Ticonderoga.....*Wilson*
Tableau, *The Spirit of Seventy-Six*
After the painting by Willard
The Old Continentals.....*McMaster*
The Little Black-Eyed Rebel...*Carleton*
Essay, *A Tribute to Washington*
The American Flag.....*Drake*
Song, *Hail Columbia*

2

Oh, let freemen be our sons,
And let future Washingtons
Rise to lead their valiant ones,
Till there's war no more. *Pierpont*

Song, *Columbia the Gem of the Ocean*
The Ship of State.....*Longfellow*
Flag salute
Girls may be dressed to represent the states
The Name of Old Glory.....*Riley*
Grandmother's Story of Bunker Hill..
..... *Holmes*
Essay, *The "Sane Fourth" Movement*
Song of Marion's Men.....*Bryant*
Essay, *A Tribute to Franklin*
The Flag Goes By.....*Bennett*
Essay, *What My State Has Done for the Country*
America for Me.....*Van Dyke*
Paul Revere's Ride.....*Longfellow*
Nathan Hale.....*Finch*
Song, *Star-Spangled Banner*

From the day of this Declaration the people of North America were no longer the fragment of a distant empire * * *. They were a nation, asserting as of right, and maintaining by war, its own existence. A nation was born in a day.

INDEPENDENCE HALL. See PHILADELPHIA, subhead *Famous Buildings.*

INDETER'MINATE SENTENCE. In theory the object of the imprisonment of criminals has always been reformation and not vengeance, but in actual fact the punishment idea has too often been foremost. The sentence for each crime has been fixed by law or has been left in a degree to the judgment of the court, and little or no account has been taken of the character of the offender. In recent years, however, there has developed a somewhat different attitude toward the penal system. Two purposes, declare reformers, should govern the commitment of any wrongdoer to a reformatory or prison: he should be confined for the safety of society and for his own moral betterment, and his confinement should last long enough to accomplish these purposes, and no longer.

Obviously, they argue, it is impossible for a judge to tell how long a man will require to become fit to mingle again in society, and the sentence therefore should be *indeterminate*—that is, indefinite. The ideal thing, according to prison reformers, would be an absolutely elastic sentence, which imposes no limits but leaves the question of release or detention to properly-selected prison authorities. Nowhere, however, has the principle been pushed to this extreme, nor is it likely to be until conditions in prisons and reformatories have been considerably changed.

But the indeterminate sentence in a more restricted sense—the sentencing of a man for a term of not less than one or more than fourteen years, for instance—is in force in a number of the states and provinces of the United States and Canada. The system was first worked out in New York in connection with the Elmira Reformatory, and later was tried in connection with the state prisons in that state. Gradually it has gained ground, and while it has not been unqualifiedly successful, there exists little doubt as to its superiority over the older inflexible method.

INDEX EXPURGATO'RIUS, a title used in the Roman Catholic Church to designate a list of books deemed heretical or immoral and prohibited by Papal authority until objectionable matter is eliminated. All versions

of the Bible by unauthorized persons, books relating to magic and any book harmful to the faith or morals of a Catholic, are included in the *Index*. In 1607 the first volume of an *Index Expurgatorius* was issued at Rome. Pope Leo XIII revised the list and about 3,000 books were taken from it. Books are placed under the ban by the *Congregation of the Index*, organized in 1586, which is composed of theologians and cardinals. They exercise their judgment as to whether the book is to be corrected, to be read under certain conditions, or merely by certain classes of people, or is to be banned entirely. G.W.M.

INDIA, a country of Southern Asia which constitutes a great empire under the rule of Great Britain. Australia and the Dominion of Canada among British dependencies surpass it in size, but no other British possession compares with it in population; for nearly three-fourths of all the inhabitants of the British Empire live in this one country of India, which is, next to China, the most populous section of the world. The whole of Europe west of Russia—those great countries which have made a large proportion of the world's history—just about equals India in size and in population.

The Land of Romance. Few countries in the world make a stronger appeal to the romantic instinct than does India. Far back in ancient times it was celebrated for its fabulous riches, its manufactures, the more than royal splendor in which its rulers lived, and the high state of civilization which prevailed. In the Middle Ages wonderful tales were told of that land beyond the sea and beyond the desert, and it was the attempt to find a shorter route to its treasures which led to many of those voyages of discovery with which modern history may justly be said to begin. For many years after the British made their influence felt there it remained a land of mystery; and though to-day it has been thoroughly explored and described; though Kipling and various lesser writers have discovered its value in "literary setting" and have made readers everywhere familiar with much of its life, it does not lose its interest for us. Travelers say that it is one of the countries which does not disappoint the eager visitor; despite the poverty and misery to be seen on every hand it keeps its romantic aspect as a land veiled, withdrawn, never to be wholly understood by people of the West. Highways teeming with crowded life, temples with wind-swayed bells, grotesque idols, weird priests, "coral strand"—above all, a mind looking back through thousands of years to a time long before the European nations came into being—all of these India means to the person who has allowed himself to feel its spell.

Location and Size. Asia has three great peninsulas jutting southward; the central one of these is India, but the Indian Empire, which is meant by the term India in this article, includes much more than the peninsula. There is a great continental territory to the north, while to the east, beyond the Bay of Bengal, lies Burma, also a part of the Indian Empire. Strictly speaking, however, Burma is not India, and it is therefore given treatment in these volumes in a separate article.

LOCATION MAP

To the north India is shut off from the rest of Asia by the vast ranges of the Himalayas, far more effective barriers than the seas which wash its southern shores; and spurs of these mountains separate Burma on the east from Siam. The westward shores of the peninsula are washed by the Arabian Sea, on the south

is the Indian Ocean, and on the east the great curve of the Bay of Bengal.

India proper, without Burma, is a fairly compact, though irregular, region, with a north and south length of 1,900 miles and a breadth at the north approximately the same. Differing estimates are given of its area according as the British territory, including Burma, is meant, or the British territory and the native states, which are only partially under British control. The total area, in this latter sense, is 1,802,657 square miles, of which the native states make up somewhat more than 700,000 square miles, and the total population is a little over 315,000,000. India is therefore a little more than half as large as the Dominion of Canada, with nearly forty times as many people as dwell in British America.

The People of India

This vast body of people does not comprise one nationality with one name. Four stocks are found among the people of India. The oldest, though not the most important, are such wild hill tribes of the interior as the *Gonds* and the *Bhils,* descendants, probably, of the earliest inhabitants of the country. Nothing can give a better idea as to the state of civilization which exists among these tribes than Kipling's striking tale, *The Tomb of His Ancestors.* Then there are the *Dravidians,* curious dark-skinned people of the south; the *Mohammedans,* who are in part descendants of invaders who came from Arabia during the early centuries of Islam and in part later converts; and, most numerous of all, the Hindus, Aryan peoples of pure or mixed race who live in that north central portion of the country properly known as Hindustan.

Characteristics. These are the peoples of India; and how can any general characteristics be asserted of a nation which is in reality many nations? There are, however, a few general statements which may be made. There is no patriotism, for there is no feeling of nationality, but in a sense its place is taken by devotion to the ancestral religion, whether it be Hinduism or Mohammedanism. Totally devoid of any desire or ability to organize, these peoples are far more easily ruled than any Western races which possess the instinct for self-organization. For the most part, the people of all races and faiths are industrious, temperate and patient, make slight demands on life and endure hardship with an unmurmuring fortitude entirely strange to Western character. Superstition is rife, and is connected with every phase of the religion, which in its turn is connected with practically every phase of life. Like most Orientals, these people of India have a fondness for meditation upon mystic subjects which makes it possible for them to grasp easily ideas which the Western world does not understand. Missionaries find no difficulty in convincing them of the incarnation of God in Christ; that to them is a perfectly simple fact, for they have been taught to look upon almost every natural object as the incarnation of some god.

Caste. There can be no understanding of life in India without a study of the caste system, that barrier to democracy and progress which for so long seemed practically insuperable. For all the people of the country are divided into four great castes, and nothing—neither intelligence, nor money, nor achievement—has heretofore been able to change a man from the caste (which see) into which he was born. A man belongs either to the Brahman or priestly class; to the warrior class; to the husbandman class; or to the serving class. To the third of these belongs the great bulk of the people, not only the tillers of the soil but the manufacturing and commercial class, and upon them the other groups are dependent for support. The condition of the servile class is pitiable, for they are looked upon as so low in the scale of humanity that their touch means pollution; and the Brahman draws his chaste robes away when he passes one of them. The British government, however, has been able to better their position considerably, and the introduction of Christianity has done much to lessen the barriers between the various castes.

Social Customs. These are in large measure the result of the caste system, or of some other phase of religion. One of the outstanding features is the seclusion of the women, those of the higher classes scarcely being allowed on the streets. This restriction is not, in practice at least, binding upon the women of the lower social orders, who engage in outdoor work as freely as the men. Then there is the custom of infant marriage, after the age of ten or twelve, and, among the upper classes at least, prohibition of remarriage for women or girls, the widows becoming servants in the households of their husbands' families. When the

Languages. There is no one national language of which the other tongues are but dialects; indeed, it is estimated that no fewer than 147 distinct languages are spoken within the empire. But the speech of over half of the people belongs to the Indo-Germanic family of tongues, and is closely allied to Sanskrit (which see). The most important dialects of this language are the Hindi, spoken by 80,000,000; the Bengali, spoken by 44,000,000; and Marathi, spoken by more than 27,000,000. One very common language is Hindustani, which is Hindi mixed with Arabic and Persian.

In the southern part of the peninsula the languages do not belong to this same family, and of these non-Aryan tongues the Dravidian is the most widespread. Of course, the European languages, French, English and German, are spoken wherever these nationalities have settled, but they have made little headway among the natives.

English entered the country they found prevalent the custom of *suttee,* or the burning of widows on the funeral pyres of their husbands, but they took at once the most determined measures to suppress it. The same stern measures were used against such pagan rites as the sacrifice of human beings to the gods, and the putting to death of baby girls because they were not wanted.

Education. The highest class of all in India, the Brahmans, has never been without an educational system, such as it was, but the mass of the people have been in dense ignorance. It cannot be said that much has been done to change this condi-

It is impossible to give any general description of the dress of the country, so widely does it vary, but for the most part it is picturesque and has that looseness and lightness which a hot climate demands. White is a favorite color everywhere. The mass of the people in India are very poor, and their clothing, as well as their food and their home comforts, must be of the simplest and scantiest, but in great contrast with this is the wealth and luxury of the native princes. Some of them possess riches gathered by their ancestors through centuries, and when dressed in their robes of state wear gems of almost incredible value. Kipling in his *King's Ankus* gives a fascinating description of the treasure vaults in a ruined palace.

The illustrations show how native women live, in different stages of advancement.

tion, for while the British have established schools, both elementary and secondary, the caste system and the superstition, which largely take the place of religion, have prevented all but a comparatively few children from receiving any advantage from them. Somewhat better success has been attained by the missionary schools, which are aided by the government and which draw to them the children from the Christianized families. The "universities" of Calcutta, Bombay, Madras, Allahabad and the Punjab are but examining bodies which pass upon the work of the various colleges scattered throughout the country.

Religion. "Ye men of Athens," said Paul as he stood on Mars Hill, "I perceive that ye are in all things very religious;" and the same thing might be said to the people of India, who are indeed "very religious." The number of the faiths professed is legion, for the Oriental mind seems peculiarly fitted to the fashioning of beliefs; but one religion is clearly dominant, Hinduism or Brahmanism. It is this faith, embraced by more than 217,000,000, which has laid upon the country the curse of the caste system, has given to the people their numerous gods and has declared the cow a sacred animal. Second in the number of adherents is Mohammedanism, with 66,000,000; and all the other faiths are a long way behind these two in numbers. There are over 10,000,000 Buddhists; 10,000,000 *animists,* or spirit-worshipers; 3,000,000 adherents of the Sikh religion; and over 3,000,000 Christians, of whom about one-half are found in Madras Presidency. It is among the lower classes, those regarded by the Brahman as degraded, that Christianity has spread most rapidly.

The Cities. The population of India, even in the thickly-settled parts, lives largely under rural conditions, about nine-tenths of the inhabitants, it is estimated, living outside of the cities, most of them in villages organized by a definite system. There are comparatively few large cities, only four, Calcutta, Bombay, Madras and Hyderabad, having more than half a million inhabitants. Other cities of importance are Delhi, the capital; Benares, Lucknow, Rangoon and Lahore, each of which is described in these volumes under its title.

The Land

Coasts. The coast line of the Indian peninsula is about 3,000 miles, and much of it is very regular, except when the mouths of the great rivers widen into great deltas. On the west there are two prominent indentations, the Gulf of Cutch and the Gulf of Bombay, but on the east the breaks in the coast line are more gentle. To the southeast of the southern extremity is the large island of Ceylon, separated from the mainland by Palk Strait and the Gulf of Manar. A chain of small islands between the two is called Adams' Bridge.

Surface Features. India, excepting Burma, which is treated in a separate article, is divided into three well-defined tracts. In the north is the Himalaya Mountain region, which contains the loftiest passes and peaks in the world, Mount Everest reaching a height of 29,002 feet. India would be a very different country were it not for this vast wall which shuts off the cold winds from the bleak region to the north.

Next is the great plain of the Indus, Ganges and Brahmaputra rivers, a broad, low valley region with its frequent floods. As Egypt is the "gift of the Nile," so is this most fertile region of India the gift of these three great rivers. This is the most densely-populated part of the empire, and one of the most densely-populated regions in the world.

On the south this plain slopes gradually upward to meet the table-land of the Deccan, which with its bordering lowlands extends to the end of the peninsula. This region has an altitude of from 1,600 to 3,000 feet above sea level; and its surface is broken by numerous conical peaks, the craters of old volcanoes; for practically the whole Deccan table-land is but a heap of lava poured out in bygone days. To-day, however, it is covered in most places with a fertile soil.

Rivers. The chief rivers of the country, besides the *Irrawaddy,* which is in Burma, are the *Ganges,* the most famous as well as the most valuable commercially of all the rivers of India; the *Brahmaputra,* which joins the Ganges near its mouth; and the *Indus,* which pours its waters, with those of the tributary *Sutlej* and *Chenab,* into the Arabian Sea. Farther south there are some streams of considerable size but of no value for navigation, the *Godavari,* the *Nerbudda* and the *Krishna.*

Climate. India is a land of widely-varying climate, not only because of its great extent, but because of differing elevations. The southern portion and the lowland regions every-

where have a high temperature throughout the year, and in the summer months are practically unendurable for Europeans. On the slopes of the Himalayas, however, and in the higher parts of the Deccan the climate is delightful, and here have sprung up the "summer resorts" to which all Europeans who can do so find their way at the outbreak of the hot weather. Most famous of these resort cities is Simla, celebrated by Kipling in a score or more of stories.

Of even greater importance than the temperature, however, is the rainfall, for upon "the rains" depends every phase in the life of the people. There are but two seasons, a wet and a dry, the former lasting from June until November, the latter through the remaining months. Some regions of India, notably Assam, along the northern coast of the Bay of Bengal, receive the heaviest rainfall in the world, from 500 to 600 inches being no uncommon total; and 805 inches have been recorded in one year. Some parts, on the other hand, are arid, and in the upper Bengal provinces the lack of rain often results in those disastrous famines which play so large a part in the economic history of India (see FAMINE). Improved transportation has lessened the dangers from famine.

Resources and Industries

Minerals. Time was when India was famous for its diamonds and its rubies, but to-day the output of its mines is far less gorgeous, if more practical; for coal is now its principal mineral product. The growth of coal mining is recent, and has kept pace in a measure with the growth of railways, for it is chiefly to supply the engines that it is in demand. Somewhat over 14,000,000 tons is now the annual output. Petroleum is plentiful, and gold is found in considerable quantities, but of other minerals the yield is small. What vast riches the Himalayan ranges may contain cannot even be conjectured.

Manufactures. The native inhabitants of India have always been, since first the Europeans became acquainted with them, famous for the exquisite and delicate fabrics which they know how to weave, and the manufacture of these is still carried on in the homes, with the simplest of looms. Beautiful rugs and carpets, too, are produced in the province of Kashmir, and metal work of fine quality is everywhere for sale. The natives themselves, however, now make comparatively little use of the beautiful hand-wrought products, whether textile or metal, since the factory-made articles of England can be imported so cheaply. Cotton mills have been introduced into India, and now their yield is the largest manufactured product. Carved woodwork, showing a delicacy and skill wonderful to Western eyes; cashmere shawls, paper, woolens, indigo and sugar are among the other products, some of them very extensive.

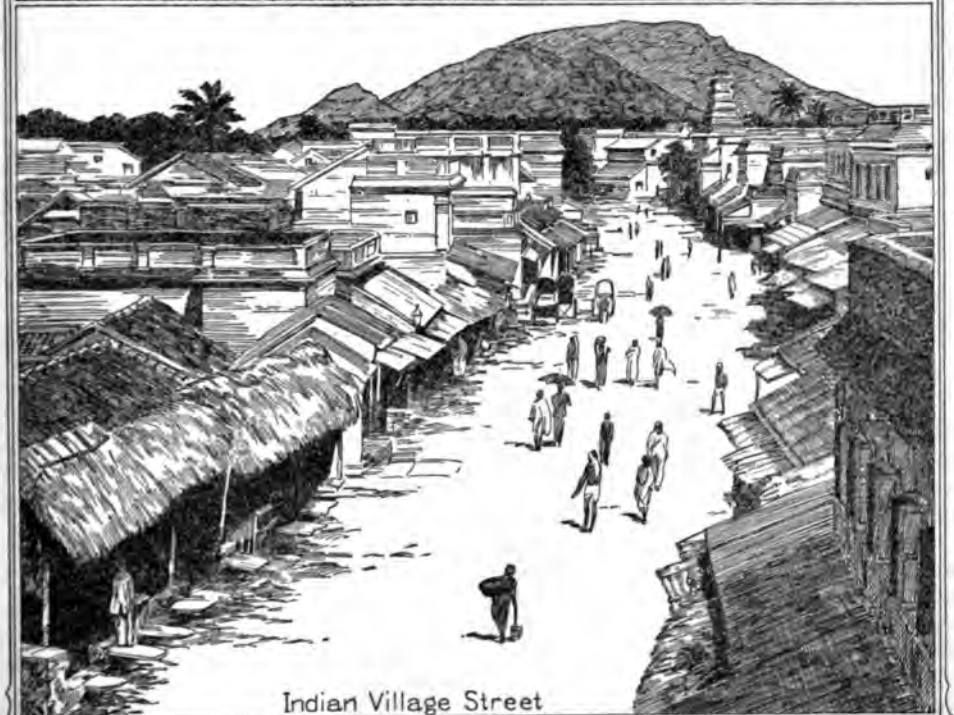
Agriculture. This is the main dependence of the people, the industry upon which from time immemorial most of them have relied. By bettering transportation facilities and increasing the irrigation projects, Great Britain has done much to promote agriculture, and would have done much more had the people not been so immovably opposed to the introduction of machinery and even of modern implements. Holding firmly to their primitive methods, the natives have far smaller crops than might otherwise be the case, but the soil is for the most part fertile, and if the moisture is sufficient it produces well. The rainfall is very uncertain and with its failure come those frightful famines which carry off scores of thousands of people. To offset these famines by storing up grain and rushing it from the regions of plenty to the starving districts has been one of the great tasks of the British government.

The government has constructed great reservoirs for irrigation purposes, not only in those sections like Sind and the lower Punjab, which must be irrigated every year, but in places which are liable to occasional drought. Altogether, at least one-sixth of the total area under crops is irrigated, and of this at least half is supplied with water from government projects.

In the delta regions, when there is plenty of water, rice is the great crop, and about 76,000,000 acres, or more than one-third of the total area under crops, is planted to rice. It is generally stated that rice is the staple food stuff of India, but careful authorities estimate that only about one-third of the people depend upon it entirely. The crops of next importance are wheat, millet and other grains; cotton, sugar cane, oil seeds of various kinds, indigo, tobacco, tea, coffee and opium. Most of these crops are rather clearly localised, Bengal producing most of the rice, the northwest provinces the chief wheat crops, certain high regions in the southwest the coffee, and Bengal and the United Provinces of Agra and

NATIVE LIFE IN INDIA

Home of Native Christian



Indian Village Street

Oudh, the sugar. Opium, which is practically restricted to the region about Benares, is a government monopoly.

Transportation and Commerce. India is crossed and recrossed with railways; it is the only part of Asia of which this can be said. All the large cities are connected by railway lines, which run also into the famine districts and bind together regions not long ago separated from each other almost as effectively as pole from pole. In all, there is a total in India of about 33,500 miles, fully three-fifths of the mileage of all Asia; and of this a large part is under the control of the government, either directly or through operating companies. Canals, too, are numerous, connecting certain of the rivers, and these, with the railways and the rivers themselves, help to give India good transportation facilities, except in the interior mountain region.

Long before it came under European influence India had a flourishing trade, and it was for commercial advantage that the European peoples seized upon the country. To-day it has a very large commerce, amounting to about a billion and a half dollars annually. Of this somewhat more than one-half is exports, which consist largely of cotton, rice, indigo, wood, opium, tea, coffee, wheat, hides and jute; while the chief imports are cotton goods, hardware and other manufactured articles and foodstuffs. A large proportion of the trade is with Great Britain, but the United States, China, Japan, the Straits Settlements, Germany and Austria-Hungary have been for some years well represented in its trade.

Government and History

Government. Since 1858, after the close of the Sepoy Rebellion, the ruler of Great Britain has been sovereign also of India, and in 1877 Victoria was proclaimed Empress of India. There is in the British Cabinet a secretary of state for India, and he, with his under secretary and council, is at the head of the government of the empire. The chief executive officer, however, is the Viceroy, or Governor-General, who resides at Delhi. He is appointed by the Crown for a term of five years, and has as his assistants a council of six members. This council may be enlarged by the addition of certain British and certain native representatives, and in its enlarged state serves as a legislative body. The Viceroy is left to his discretion in most matters concerning the internal administration of the empire, but on questions of foreign policy he is subject to the secretary for India. Two presidencies, those of Madras and Bombay, have as their chief administrative officers governors appointed directly by the Crown, but the other states of British India are under lieutenant-governors or commissioners appointed by the Viceroy with approval of the Crown.

In addition to these states under direct British control there are in India a number of native states in which the native rulers still hold authority, though they are not allowed to embark on enterprises of importance without the consent of the Viceroy. Everywhere in India it has been the policy of the British to place local matters as much as possible in the hands of the natives, with the object of training them in self-government and of awakening in them a feeling of nationality. The details of local government are too complicated for description here; they differ according to the varied conditions throughout the Empire.

Beginnings of History. Very hazy are the earliest accounts of the history of India, the Hindu writings claiming for the country an antiquity of many thousands of years. Just when the Hindus or Aryans came from the northwest mountain region and conquered the earliest inhabitants is not known, but it was probably about 2000 B. C. In the sixth century B. C. the Persians under Darius invaded the country, and the next event of importance was the expedition of Alexander the Great into the country. The description of manners and customs given by his historians shows that the people changed remarkably little in the two thousand years before the modern European occupancy.

The Troubled Middle Period. All during the centuries known in European history as the ancient and medieval periods, India was in a constantly shifting condition. First one state, then another, would gain supremacy, and occasionally conquerors from the outside would sweep over the country, leaving a strong impress. The Mohammedans came and set up an empire; the Mongols under the great conqueror Timur, or Tamerlane, gained a firm hold; but never at any time was there any feeling of nationality developed, and the breaking up of the strong empire of the Moguls left the country an easy prey to the Europeans.

The Coming of the Europeans. The first to arrive were the Portuguese, who early in the sixteenth century seized some ports on the west coast, and by 1613 the English, too, had established themselves. Soon came the French, and between them and the English a rivalry sprang up. In 1744, while the two countries were at war in Europe, open hostilities broke out in India as well, but not until 1757, when Clive won the decisive battle of Plassey, was it really settled which was to be the dominant power in the peninsula. From that time, largely through the genius of Clive, England has held that rich territory as its own possession.

The British Empire. Next to Clive, the most famous of the early English administrators was Warren Hastings, who in 1774 was made first Governor-General of India. He it was who laid the foundations for the present system of administration in the empire. Wars with native states were frequent, and in every one of them the British made some gain; and if at times the methods used were open to criticism, in many ways the people of India were benefited. Feeling that a "buffer state" was needed on the north to protect India from the invasions of foreign powers, Great Britain undertook the first Afghan War in 1839. Defeated in the early campaigns, the British forces were later successful, but ultimately Great Britain gave up its hold on Afghanistan, but retains control of its foreign relations.

A Great Crisis. In 1857 occurred the Sepoy Rebellion, the most impressive event in the history of British India. To the British the determining causes seemed small and unimportant—such superstitions as that which forbade the natives to bite the cartridges greased with the fat of the sacred cow and the despised pig; but to the natives themselves they were real enough to dictate a very real rebellion. The events of this outbreak are treated in the article SEPOY REBELLION. Its effects were far-reaching, for it resulted in the transfer of the government of India from the East India Company (which see) to the Crown. Not until years later, in 1877, was the queen actually proclaimed Empress of India.

The Last Half Century. Meanwhile, despite occasional native risings, famines and problems manifold, there was marked progress in India, which was steadily becoming one of the most valuable colonies possessed by any European nation. The Afghan War of 1878-1880 was an unusually-sharp conflict which resulted in the success of the British, and in 1885 the rich territory of Burma was annexed to British holdings. Another serious outbreak occurred on the Afghan frontier in 1897, but again the British were in the end victorious. Particularly distressing was the great famine of 1899, which caused untold suffering to millions of people, and the British acquired a hold on the affections of the people by their efforts to allay the distress. The attitude of Great Britain toward

A RULING PRINCE
The maharajahs possess jewels of almost fabulous value, and these are worn on all state occasions.

Tibet almost led to an open break with Russia, but in 1903 that difficult mountain country was in a measure opened up to trade with England by the spectacular expedition of Colonel Younghusband.

All classes in India were not placidly content with British rule, and at intervals it has been necessary to put down risings which were inspired by men of the educated classes who dreamed of a free and self-governing India. In a manner the discontent was allayed by the appointment of Hindus to various offices, and the welcome which George V received on his visit to India in December, 1911, was most enthusiastic, while the Durbar (which see), held to celebrate the crowning of the sovereign as Emperor of India, was of unparalleled magnificence. During this visit of King George the

capital was transferred from Calcutta to Delhi, its permanent location.

At the outbreak of the War of the Nations in 1914 India proved not different from the other British dependencies in its protestations of loyalty. It was the general opinion of the world that Germany thought the native states of India would revolt from Great Britain and thus lessen the latter's participation in the war. The native princes, however, offered men and money, and very early in the fighting Indian troops were rushed to France, where they showed on strange soil the excellence of their training. A.MC C.

Consult Hornaday's *Two Years in the Jungle;* Kipling's *Beast and Man in India;* Frazer's *British India;* Boulger's *The Story of India.*

Related Subjects. The following articles in these volumes will be interesting and helpful in connection with the study of India:

CITIES

Agra
Allahabad
Bangalore
Baroda
Benares
Bombay
Calcutta
Cawnpore
Delhi
Golconda
Hyderabad
Jaipur
Lahore
Lucknow
Madras
Mandalay
Muradabad
Mysore
Patna
Pondicherry
Serinagur
Simla
Surat

COAST WATERS

Arabian Sea
Bengal, Bay of
Indian Ocean

DIVISIONS

Bengal
Bombay
Burma
Deccan
Madras
Nepal
Punjab
Rājputana

HISTORY

Afghanistan
subhead *History*
Black Hole of Calcutta
Clive, Robert
Hastings, Warren
Mogul
Sepoy Rebellion
Suttee
Tibet
Timur

LEADING PRODUCTS

Coal
Coffee
Cotton
Indigo
Opium
Rice
Wheat

RELIGION

Brahmanism
Buddhism
Caste
Mohammedanism

RIVERS

Brahmaputra
Ganges
Indus
Nerbudda
Sutlej

UNCLASSIFIED

Bengali
Fakir
Himalaya
Hindustan
Laccadive Islands
Sikhs

INDIA INK, an absolutely black pigment made of lampblack mixed with glue or gum. It was known and used in China at about 2600 B. C. The best lampblack for this purpose is obtained from oil of sesame. The lampblack and glue are first made into a paste, which is then placed in molds to dry. When required for use as ink it is mixed with water. It is in great demand for pen-and-ink drawings which are to be photographed and resolved into printing plates, as it is the only known pigment which is really black without a shade of any other color. The drawings appearing in this work to illustrate reading matter were all originally drawn with India ink, four to six times as large as they appear in print.

INDIANA, one of the north-central states of the American Union, popularly known as the *Hoosier State.* The meaning of this nickname, which is used far more commonly than the popular names of most other states, no one has been able to fathom; it is doubtless some local term, the origin of which is forgotten. As its state flower emblem Indiana has chosen the carnation. Its state song is "On the Banks of the Wabash."

Size and Location. Indiana is one of the states with a considerable north and south extension, its greatest length being about 280 miles and its greatest breadth 145 miles. Its area of 36,354 square miles gives it rank as thirty-seventh in size among the states of the

Union. It is, however, larger than all the New England States, excluding Maine.

Popularly called a "middle western" state, Indiana is far to the east of the center of the country. On the north it is bounded by Michigan and, for a distance of about sixty miles, by the southern shore of Lake Michigan; on the east by Ohio, on the south by Kentucky, from which it is separated by the Ohio River, and on the west by Illinois, the Wabash River forming the southern part of the boundary between these two states. About 440 square miles of its area are water surface, more being in rivers than in lakes.

The People. The term "Hoosiers" was long a term of mild derision, but Indiana folk have proved so capable and so progressive that they have earned the right to be proud of the name. Especially in recent years Indiana has produced more than its share of the popular writers, Lew Wallace, James Whitcomb Riley, Maurice Thompson, George Ade, George B. McCutcheon, Booth Tarkington and others, giving rise to the saying that "Every Hoosier is born with a pen in his hand."

The state had 2,700,876 inhabitants in 1910 and thus ranks ninth among the states in population. A hundred years earlier the population was but 24,520. In 1917 the number of people was estimated at 2,826,154 by the Federal Census Bureau. Especially noteworthy in any study of the inhabitants of Indiana is the relatively-small proportion of foreigners among them, only 5.9 per cent being foreign-born. The average number of people to the square mile was 74.9 in 1910, and considerably more than half of the people lived under rural conditions. The number of people per square mile in all the United States in the same year was 30.9. There are within the state about ninety cities with a population exceeding 2,500, ten of these having over 20,000 inhabitants each. These in the order of their size, are Indianapolis, the capital; Evansville, Fort Wayne, Terra Haute, South Bend, Muncie, Anderson, Richmond, Hammond and Lafayette. Another city, Gary, attracted considerable attention early in the twentieth century. In 1900 its site on Lake Michigan was but a wilderness of sand; ten years later there had arisen a prosperous "steel city," which before 1925 will doubtless be the home of 50,000 people. It has now every modern improvement and a school system to which the whole country has looked for inspiration. See GARY SCHOOL SYSTEM.

Education and Religion. No state has shown a greater and more intelligent interest in education, and of the people above the age of ten there are but 3.1 out of every 100 who are unable to read and write. The school system is excellent, and its administration has been of late years particularly effective. In the course of a year the state pays out for school purposes somewhat more than $16,000,000, over half of this being in salaries to teachers. There are compulsory education laws, demanding of all children between the ages of six and fourteen attendance at school for at least six months out of each year, and out of the 766,000 persons of school age in the state, about 548,500 are enrolled. High schools form a part of the regular school system, and there are in the state about 800 of these. Not all are of such a nature as to send their pupils direct to college without further preparation, but the standard is constantly being raised. The number of pupils attending rural schools has been increased by the introduction of the consolidated district system. Indiana has been very progressive in such matters as vocational and industrial training, and the state agricultural school in connection with Purdue University at Lafayette has promoted very effective work among the rural population. Of especial interest have been the clubs which by competition have stimulated the boys and girls to the raising of various crops by the most systematic modern methods.

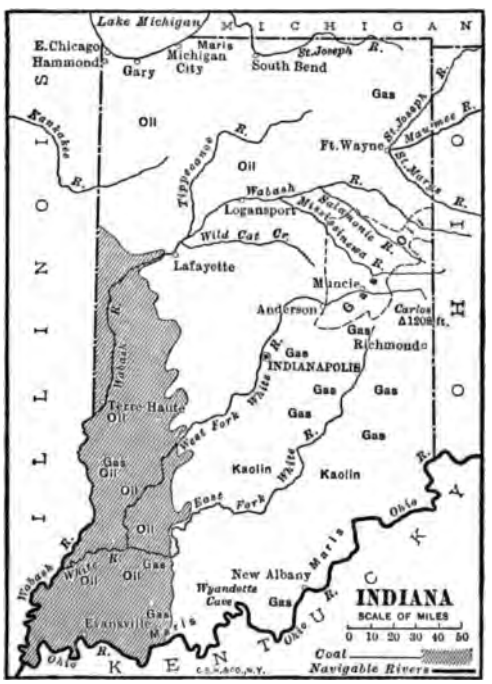
The teachers' institutes of Indiana have been noteworthy in their results. Each township gives at least one Saturday a month to such a gathering, and the teachers here get new inspiration and solutions of many of their most difficult problems.

Among the higher institutions of learning in the state may be mentioned Indiana University, at Bloomington; Purdue University, at Lafayette; De Pauw University, at Greencastle; University of Notre Dame, at Notre Dame; Wabash College, at Crawfordsville; Vincennes University, at Vincennes; Butler College, at Indianapolis, and Valparaiso University, at Valparaiso.

Of all the churches, the Methodist Episcopal is the strongest in Indiana; indeed, in no other Northern state has this denomination so large a membership in proportion to the total number of church members. The Roman Catholics, on the other hand, have a smaller proportionate membership than in any other Northern state, although ranking second in

numbers. The Disciples of Christ, or Christian Church, have increased their numbers very rapidly, and now have considerably over 100,000 members within the state, giving this denomination third rank.

Surface Features. Indiana, like Illinois, lies in the great Mississippi Valley and in the basin of the Great Lakes, and in general its surface features are much like those of Illinois. Ages and ages ago, in the great Glacial period



INDIANA

The map shows state boundaries, locations of coal, gas and oil fields, principal cities and rivers and the highest point of land.

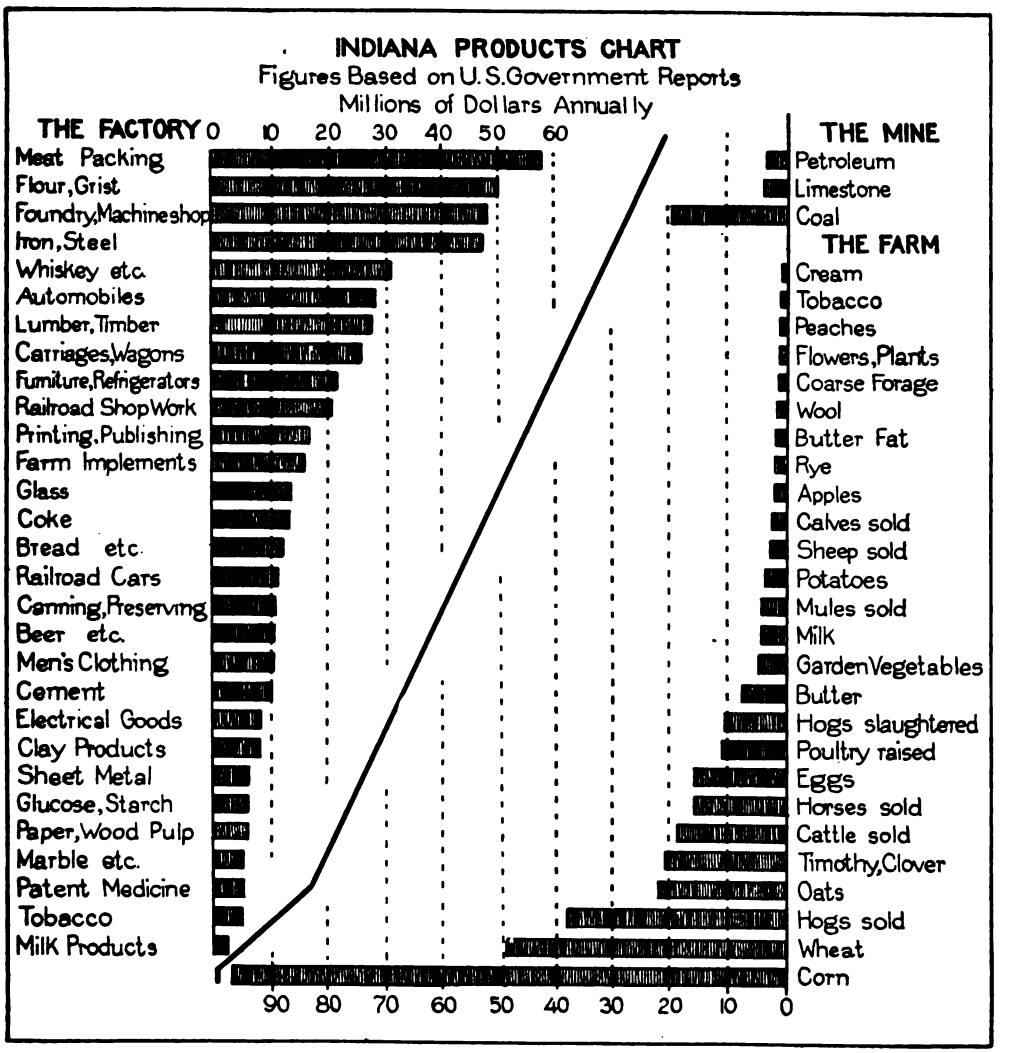
(which see), almost all of the state was covered with the vast ice sheet, and many of the rugged hills are but old *moraines*—drift heaps dropped by the glaciers. The state has, in general, a slight slope to the south and west, the highest elevation, about 1,250 feet, being found near the eastern boundary line. The northern region is decidedly picturesque. Along the lake are the "dunes"—rounded hills of glistening, wind-swept sand which form a striking background for the dark green of the scrub oaks which here and there grow out of them. Farther east is the broken, hilly country with its blue lakes—a real "summer resort" region, much appreciated by tourists. In the autumn large stretches of this northern district show a wonderful glow of color, when the frost has turned to crimson and yellow and brown the leaves of the maples, elms, beeches and oaks.

Indiana is not primarily, like Illinois, a prairie state, and not very long ago almost the whole state was under a heavy growth of timber; but the nearest approach to the level prairie land is the plain in the center of the state, the most fertile, and in consequence the most thickly settled, part of the state. Farther south is a region of uneven, broken surface, culminating in a series of steep hills or "knobs" so rugged and deeply-carved that the dwellers in this neighborhood claim for them the sounding title of the "Hoosier Alps."

Far to the south there are some curious formations. Underground streams have washed out great hollows in the soft limestone, and sinks or caverns have been the result, some of them of rare beauty. Wyandotte Cave, in Crawford County, is in extent second only to Mammoth Cave of Kentucky among the caverns of the country, nor does the latter much surpass it in interest and beauty. This southern part of the state has some valuable mineral springs, also, and French Lick and West Baden in Orange County are famous throughout the Middle West.

How the State is Drained. By all means the most important river of Indiana is the Wabash, which crosses the state from northeast to southwest and with its tributaries drains about two-thirds of the area. Its chief affluent is the White River, which carries a volume of water not much less than that of the Wabash itself. The Kankakee, a slow, lazy stream, flowing for much of its course through marshy land, carries a part of the drainage of the state across Illinois to the Mississippi, while in the south a few short and unimportant streams flow into the Ohio. In the northeast the Maumee drains a small area into Lake Erie, and in the north the Saint Joseph flows through a corner of Michigan and empties into Lake Michigan.

Climate. In general, the climate of Indiana is fairly equable, but July and August have many hot days. The sweeping winds from the north often bring bitter cold during the winter months. The average annual temperature for the state is 52°, and, because of the extent of latitude covered, the difference between the extreme north and the extreme south is noticeable, the average for the former being 48°, for the latter 56°. The south has about two months more "growing weather" than has the north—that is, the period between the last frost in the spring and the first in the fall is



that much longer. Everywhere in the state the rainfall is sufficient for agriculture, the amount varying from thirty-five inches in the north to forty-six in the Ohio valley. Heavy snowstorms are common in the north in winter, but the southern portion has comparatively little snow.

Agriculture. With its favorable climate and its fertile soil, Indiana is excellently adapted to agriculture. Almost everywhere the forests have been cut down; to-day about ninety-four per cent of the total land of the state is in farms, and of this farm area almost eighty per cent is improved. The crops are varied, but corn stands always at the head of the list in value; in corn production Indiana is surpassed only by Illinois, Iowa and sometimes Nebraska and Missouri, its crop being about six per cent of that of the entire United States. The corn crop averages nearly 200,000,000 bushels yearly, with a value of over $90,000,000. Wheat, the second crop in importance, is worth about half as much. Hay and oats rank next, while in the river region of the south, with its very fertile loess (which see), tobacco is a valuable crop. Indiana ranks ninth in wheat acreage, and seventh or eighth in production, the latter averaging about 40,000,000 bushels.

In the northwestern part of the state, in the lake basin, is a region which is practically a great marsh, under flood every spring; but here a special system of underdraining, with millions of yards of drain tiles, has been introduced, and vast truck farms have been devel-

oped. This is an especially favorable location for such crops, for the celery, potatoes, onions, cabbages and other vegetables raised here are easily disposed of in near-by Chicago. Throughout the state various fruits are plentifully grown, apples, peaches, cherries, pears and strawberries constituting the main yield.

Though not one of the chief stock-raising states, Indiana has an ever-increasing number of domestic animals, their total value approximating $180,000,000. The dairy industry is of importance, over $9,000,000 worth of farm butter being produced in a year.

Important Minerals. Indiana is not one of the foremost states in the production of minerals, yet it has a very considerable mineral wealth. Of first importance is its coal, which is found chiefly in the southwestern section, and covers an area of about 6,500 square miles. This is bituminous coal of excellent quality, much of it specially adapted to blast-furnace use, and the quantity mined each year, about 16,000,000 short tons, gives the state sixth or seventh rank as a coal-producer.

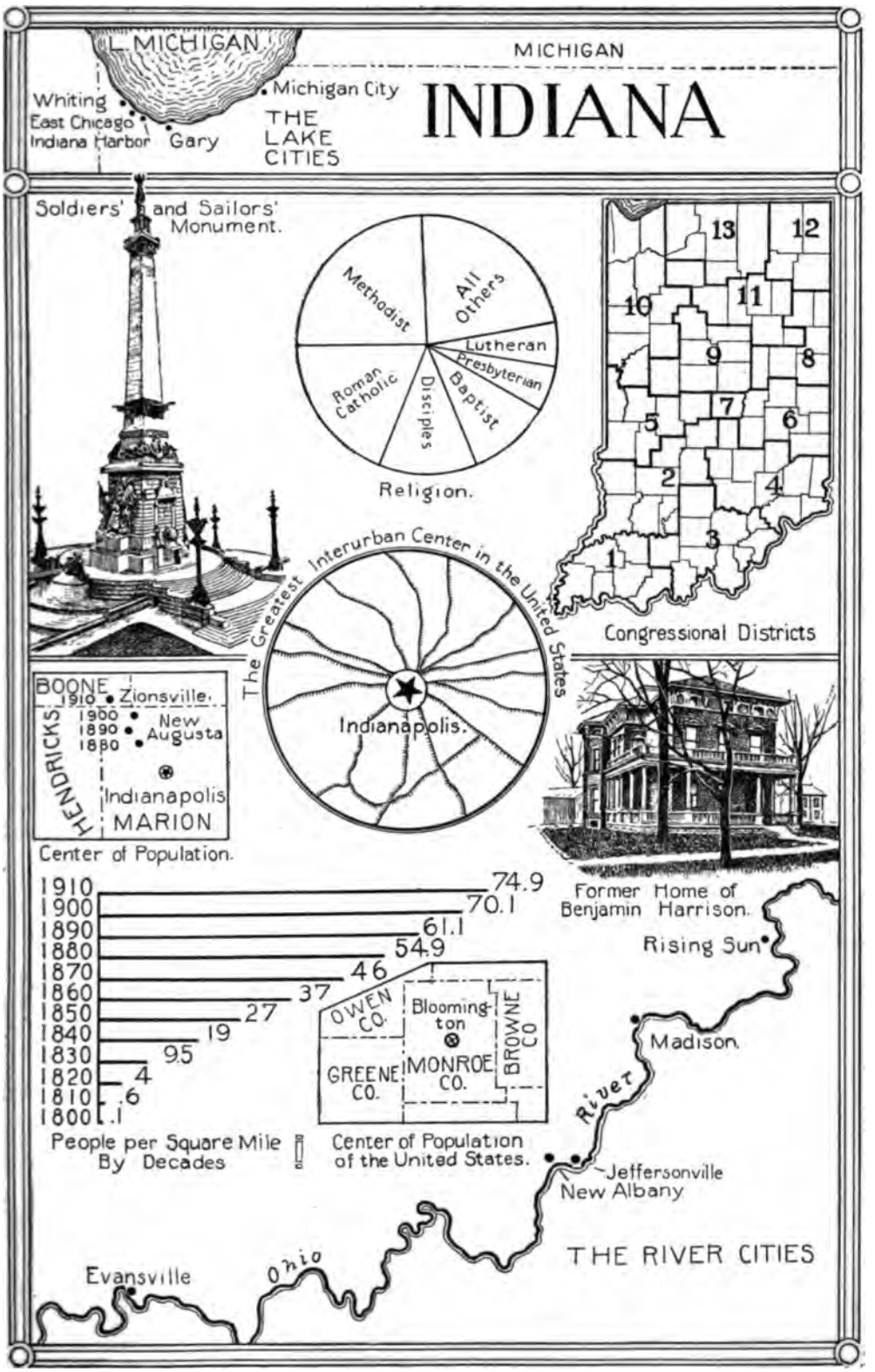
One of the most characteristic mineral outputs of the state has been its natural gas, which was discovered in 1886 and used most extravagantly, not to say wastefully. Time proved that the supply was by no means inexhaustible, as was at first believed, and the yield decreased ninety per cent between 1905 and 1915. The production of petroleum, too, decreased during that decade, as that of Illinois increased. Portland cement is a chief product of the state, and valuable brick and tile clays are widely distributed. In Lawrence and Monroe counties a special kind of building stone, called Bedford limestone, is quarried, which is extensively used throughout the country for buildings.

Manufactures. Where timber, natural gas, petroleum and coal are found, there are certain to be manufactures in abundance, and Indiana has an industrial career which has followed every fluctuation in the production of its various kinds of fuel. When natural gas was discovered in the east-central part of the state, for instance, manufacturing establishments sprang up quickly, glass-blowing factories being of especial importance; and as the supply of gas has declined, these have lessened, many either closing entirely or moving to other localities. But the manufactures of the state as a whole have shown a steady growth, for the increased production of coal has more than made up for the decrease in other fuels. The state ranked eighth among the states in the value of its manufactured products at the census of 1914, having advanced one place since 1909.

In Indiana, as in Illinois, the chief industries are those connected with slaughtering and meat packing, which are centered at Indianapolis. Flour and grist rank second in value, as is but natural in a state whose chief crops are cereals. Of almost equal importance is the manufacture of steel and iron and their products, and this has grown so rapidly that the supremacy of the other industries is threatened. East Chicago and Gary, both near Chicago, are the centers of the iron industry; Gary has the largest individual steel plant in the world. Automobiles and carriages are made in great numbers, South Bend possessing one of the largest and most noted wagon factories in the world; and distilled liquors, lumber and timber products and agricultural implements are among the very important manufactured products. In the total value of its manufactures, Indianapolis ranks first among the state's cities, producing in a year considerably over $125,000,000 worth.

Transportation. With New York and Boston to the east and Chicago and Saint Louis to the west, and with Lake Michigan making impossible transcontinental lines farther to the north, Indiana lies in the path of the great east-west trunk lines of railway. There are, too, important north and south lines, and Indiana thus has unusually good transportation facilities, except in the extreme southern counties, where the surface is so broken and uneven that railway construction has been very difficult. The total mileage of roads within the state is about 7,360, or somewhat more than twenty miles for each hundred square miles of area. Indiana has been one of the foremost states in the construction of electric railways, and interurban lines, with fast trains and the best of equipment, connect many of the towns. In all, there are over 3,000 miles of such railways. The greatest central station in the world for interurban traffic is at Indianapolis.

Of the streams within the state only the Wabash, which is navigable at flood time as far as Lafayette, is of any service for transportation, but the Ohio River on the southern border has played an important part in the development of the state. On the northwest, too, Lake Michigan furnishes an outlet, at Gary and Michigan City. In earlier times two canals attained considerable importance, but they are no longer used.


L. MICHIGAN
MICHIGAN
Whiting
East Chicago
Indiana Harbor
Gary
Michigan City
THE LAKE CITIES
INDIANA
Soldiers' and Sailors' Monument.
Methodist
All Others
Lutheran
Presbyterian
Baptist
Disciples
Roman Catholic
Religion.
13
12
11
10
9
8
7
6
5
4
3
2
1
Congressional Districts
The Greatest Interurban Center in the United States
Indianapolis.
BOONE
1910 Zionsville.
1960
1890 New Augusta
1880
HENDRICKS
Indianapolis
MARION
Center of Population.
Former Home of Benjamin Harrison.
1910 74.9
1900 70.1
1890 61.1
1880 54.9
1870 46
1860 37
1850 27
1840 19
1830 9.5
1820 4
1810 .6
1800 .1
People per Square Mile By Decades
OWEN CO.
Bloomington
BROWNE CO
GREENE CO.
MONROE CO.
Center of Population of the United States.
Rising Sun
Madison
River
Jeffersonville
New Albany
THE RIVER CITIES
Evansville
Ohio

Government and Institutions. Indiana has had two constitutions since its admission to statehood in 1816, and the one under which it is governed at present dates from 1851. Either house of the legislature may propose an amendment, which does not become a part of the constitution until it has been approved by both houses at two successive sessions and ratified by a majority vote of the people. The constitution when adopted restricted the suffrage to white males, and though the Supreme Court of the United States declared in 1866 that such

FIRST CAPITOL BUILDING
Built at Vincennes in 1816. It is preserved as the oldest historic landmark in the state.

a restriction was null and void, it was not removed from the constitution until 1881. No provision, either in the constitution or by statute, is made for the direct nomination of any candidate, nor for direct primaries. In certain legislation Indiana has shown itself very progressive. For instance, it has statutes forbidding the employment of children under fourteen years of age in any factory, and it has strict laws regulating employers' liability.

Departments of Government. The executive department consists of the governor and lieutenant-governor, chosen for four years, and a secretary of state, attorney-general, auditor, treasurer and superintendent of education, elected for two years. The governor may not succeed himself, and none of the officials with two-year terms may hold office more than four years out of any six.

The legislature, or general assembly, comprises two houses—a senate of fifty members and a house of representatives which may not have more than one hundred members. Senators are elected for four years, representatives for two years. The legislature meets biennially, in the odd-numbered years, and its sessions are limited to sixty days.

At the head of the judicial department is the supreme court, consisting of from three to five judges whose term of office is six years. There are also an appellate court, circuit courts, and a system of county and justice courts. Juvenile courts have also been introduced, with the success which has attended them everywhere. Indiana sends to the Federal Congress, according to the last apportionment, thirteen representatives.

Charitable and Penal Institutions. These are all under the direct supervision of a Board of State Charities, which is composed of non-salaried members appointed by the governor. It is absolutely forbidden that politics or religion be taken into consideration in the choosing of superintendents or other officials for the institutions, merit alone regulating the choice. There are five hospitals for the insane, at Logansport, Indianapolis, Richmond, Madison and Evansville; a school for feeble-minded youths at Fort Wayne; a soldiers' and sailors' orphans' home at Knightstown; a colony for epileptics at New Castle; a school for the deaf and a school for the blind at Indianapolis; and a soldiers' home at Lafayette; while the penal institutions include the state prison at Michigan City; the state reformatory at Jeffersonville; the boys' reform school at Plainfield; the girls' reform school at Clermont, and the woman's prison at Indianapolis. This last-named institution was the first woman's prison established in the United States. In it, as well as in the state prison and the reform schools, the principles of parole and indeterminate sentence are in force. Indiana has shown itself ready to adopt the most improved modern methods, and no state in the Union possesses a more carefully administered system of charitable and correctional institutions.

History of Indiana

The Pioneers. The woods and streams of Indiana were most inviting to the French fur-traders, and it is probable that some of them entered the state in 1679. In the next year La Salle crossed the portage from the Saint Joseph to the Kankakee River, and from that date various explorers found their way into the territory, tracing the course of its rivers and making friends with the Indians. The Miami and Wabash tribes which occupied the country

RESEARCH QUESTIONS ON INDIANA

(An outline suitable for Indiana will be found with the article "State.")

What five states of the American Union have a combined area smaller than that of Indiana?

What and where are the "Hoosier Alps?" What was the chief difference that the pioneers observed between Indiana land and Illinois land?

What mineral product, at first thought inexhaustible, decreased so that industries suffered temporarily?

Who was the man through whose efforts the Indiana territory first came into the control of the American colonies?

What is the popular name of the state?

What is the outstanding physical feature in the region along Lake Michigan? What effort is being made in connection with them?

How does Indiana's average production of its chief mineral compare with that of Illinois?

Who was the first white man, so far as known, who entered this territory? Trace his course on the map.

Where is it possible to step from Indiana territory to Kentucky territory without crossing a bridge?

What is the most famous "natural curiosity" of Indiana? Describe its chief features and compare it with a similar formation in Kentucky.

How many states have a greater annual output from industrial establishments?

What is the explanation of the common saying that "Every Hoosier is born with a pen in his hand?"

What states does the drainage of Indiana cross?

How does the state compare in proportion of railway mileage to area with each of its neighbor states? With the country as a whole?

How much larger was the Territory of Indiana as originally constituted than the present state? What was formed of the remainder of the area?

What President received his popular name from an event which took place in Indiana?

When was the state admitted to the Union? In what manner was the date afterward celebrated?

How many states have a greater population? How many have a greater average density per square mile?

Why is it possible to grow successfully in Southern Indiana crops which cannot be produced in the northern part?

What novel treats of life in Indiana in early pioneer days? What novels give pictures of life in rural districts in later years?

How have the schools identified themselves with the interest of the people in rural districts?

What is *loess?* In the production of what crop of this state is it of special importance?

What clause in the constitution of Indiana was null and void for almost a score of years before it was removed?

How and where has a marsh been turned into valuable farm land? What are the chief crops grown on it?

seem to have received the Frenchmen gladly, but despite that fact no permanent settlement was made until the third decade of the eighteenth century. Vincennes had been established about 1727, and in 1734 eight French families settled in its neighborhood. For a half a century Vincennes was the only settlement within the present limits of the state. Its primitive, wild life Maurice Thompson described in his *Alice of Old Vincennes.*

In 1673 the territory came nominally under the control of the English, but they did not actually occupy the town of Vincennes until 1777, and then they held it but a few months, surrendering it in the next year to George Rogers Clark and his little band of picked men (see CLARK, GEORGE ROGERS).

Early National Period. The colonists had the territory in their hands, but it was by no means subdued, for the Indians were constantly on the warpath, and the little settlements which were springing up here and there were never safe from their depredations. In 1794 "Mad Anthony" Wayne, by a decisive victory called the Battle of Fallen Timbers, ended the Indian hostilities for the time being, and definite progress became possible. Meanwhile, in 1787, the region had been made a part of the Northwest Territory, but in 1800 the present states of Indiana, Illinois and Michigan were constituted a separate territory under the name of Indiana. General William Henry Harrison was the first governor, and Vincennes was his seat of government. Michigan in 1805 and Illinois in 1809 were made separate territories, and from the latter date Indiana in its present area has existed. See NORTHWEST TERRITORY.

Meanwhile the Indians, united under the famous Tecumseh, were again making trouble, but General Harrison put an end to their rising in 1811 at the Battle of Tippecanoe, which earned him his popular nickname, "Tippecanoe." When war broke out in 1812 between the United States and Great Britain the Indians seized the opportunity to renew their raids, but again they were speedily put down, and from that time Indiana has had no Indian troubles. Immigrants flocked to the territory, most of them coming from the region to the south of the Ohio, and there was a strong sentiment in favor of slavery. In 1816 Indiana became a state with definite provisions against slavery in its constitution, but the feeling against the negroes was clearly shown by a clause forbidding their immigration into the state. This restriction was removed from the second constitution. The capital, removed from Vincennes to Corydon in 1813, was in 1825 finally established at Indianapolis.

The New State. One of the first things the new state had to face was a period of wild speculation in land. The possibilities, it seemed, were endless, but the ambitious schemes failed in 1837, and the state was left bankrupt, with a debt of $14,000,000. These difficulties settled by means of compromise, the state embarked on a period of steady progress. Canals were opened, and the great National Road, completed about 1850, was a highway which put the state into close touch with the older states to the east. Fascinating pictures of the life in the "bottom-land" districts of Indiana in the middle of the century and later were given by Edward Eggleston in his three novels, *The Hoosier Schoolmaster, The Hoosier Schoolboy* and *The Circuit Rider.*

A Half-Century of Progress. The prosperity and industrial growth of the state in the decades following the war were largely due to the development of the coal deposits and the discovery of natural gas. Indiana in recent years well illustrates the adage that "happy is the people that has no history," for there have been almost no outstanding events in its peaceful progress. An occasional labor difficulty has appeared and even these worked for good, as they led to the creation of a permanent board of arbitration. There have been stringent anti-trust laws, and various legislative enactments in regard to prohibition. The saloon question was for years uppermost in Indiana's political and social life. From 1906 to 1911 a county option law was in force; in the latter year the legislature substituted for this a law making the township or ward the unit of option. In 1917 the legislature enacted a law establishing state-wide prohibition, the law to go into effect April 2, 1918. The same legislature extended to women the suffrage in all except state elections.

In politics Indiana has for many years been doubtful, and some memorable campaigns have taken place. The state had an especial interest in the Presidential campaign of 1912, as its governor, Thomas Marshall, was the successful candidate for the Vice-Presidency, on the Democratic ticket with Woodrow Wilson, and he was chosen to the same office in the election of 1916. Another Indianian, Charles W. Fairbanks, was also honored with the Vice-Presidency during Roosevelt's second Presidential term; he was the candidate for the

office in 1916, on the Republican ticket Charles E. Hughes. In somewhat earlier Thomas A. Hendricks, one of Indiana's famous sons, died while holding the office ice-President in the first Cleveland ad- tration.

er Items of Interest. The rights of In- in the Ohio River end with low-water on the north shore, and all islands in the thus belong to Kentucky. Between 1 River Island and the Indiana shore deposits now form a connecting strip of making the island no longer an island, even this peninsula the Supreme Court djudged to be Kentucky territory.

e dune region of Northwestern Indiana is orthy as the home of an unusual number ld flowers—it is, indeed, a botanist's para- and for this reason, as well as for its esqueness, efforts are being made to have aside as a public park.

ong the well-known writers native to In- , besides those named above, have been rd Eggleston, John Hay, Joaquin Miller, es Major and Meredith Nicholson.

the prisoners in the state prison about re leased out on contract to private cor- ions, while the remaining half do work e state.

1916 Indiana celebrated the centenary of mission to the Union with a series of pag- beginning on May 16. The coming of ioneers, their conquest of the wilderness, arliest schools where "lickin' and larnin'" hand-in-hand, the work of the circuit , the trials of the War of Secession—all these and many more stages in the life of the state were graphically presented. The pageants were especially noteworthy in that they dealt not merely with spectacular episodes, but emphasized as well the quiet, orderly development of the commonwealth. A.MC C.

Consult Thompson's *Stories of Indiana;* Aley and Storey's *Story of Indiana and Its People;* Esarey's *History of Indiana.*

Related Subjects. The following articles in these volumes will add much that is of interest to the story of Indiana:

CITIES

Anderson	Kokomo
Bedford	Lafayette
Bloomington	La Porte
Brazil	Logansport
Columbus	Marion
Crawfordsville	Michigan City
East Chicago	Mishawaka
Elkhart	Muncie
Elwood	New Albany
Evansville	New Castle
Fort Wayne	Peru
Frankfort	Richmond
Gary	Shelbyville
Goshen	South Bend
Hammond	Terre Haute
Huntington	Valparaiso
Indianapolis	Vincennes
Jeffersonville	Wabash

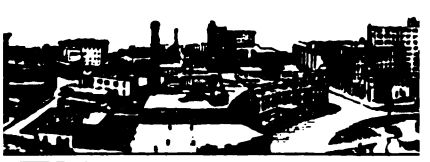
LEADING PRODUCTS

Building Stone	Oats
Cement	Steel
Coal	Tobacco
Corn	Wagon
Hay	Wheat
Meat and Meat Packing	

PHYSICAL FEATURES

Ohio River	White River
Wabash River	Wyandotte Cave

THE CIRCLE, INDIANAPOLIS



INDIANAP'OLIS, IND., the capital and largest city of the state, and the county of Marion County, noted as one of the railroad centers of the United States. It lies both banks of the White River, and n almost the exact geographical center of tate, fifty-six miles northeast of Bloom- n, the population center of the Union as determined by the United States government in 1910. Chicago is 183 miles northwest, and Cincinnati, Ohio, is 109 miles southeast. The city has transportation facilities through the service of seven trunk lines of railroad and nineteen electric lines. The railroads entering the City are the Chicago, Indianapolis & Louisville; Cincinnati, Hamilton & Dayton;

Cleveland, Cincinnati, Chicago & Saint Louis (Big Four); Illinois Central; Lake Erie & Western; several divisions of the Pennsylvania Lines; and the Vandalia System.

The great interurban system of Indiana radiates from Indianapolis, its center, like a spider's web, to all important cities in the state and into Illinois, Michigan and Ohio. Shipping facilities are further increased by the Belt Railway, which surrounds the city. Its central location and transportation facilities have made Indianapolis an admirable convention city. In 1916 the population was estimated by the Federal Census Bureau to be 271,708; in 1910 it was 233,650. The area of the city exceeds thirty-four square miles.

Location and City Plan. Indianapolis lies 700 feet above sea level, in a rolling, well-wooded country, rich in mineral and agricultural resources. It is a city of homes, and has long been noted for its streets, some of which are 120 feet wide and beautified by abundant growths of maple and elm trees. In the city are some of the finest residence districts in the United States; most of the working men own their homes, and the scarcity of tenement dwellings is noticeable. The heart of the city is occupied by a circular plaza known as Monument Place (formerly Governor's Circle), and from it radiate four wide avenues to the four corners of the city. In the center of this plaza is a magnificent soldiers' and sailors' monument designed by Bruno Schmitz of Berlin, one of the most artistic memorials in the world. It is a shaft of bronze and stone 285 feet in height, surmounted by a figure thirty-eight feet high, representing "Victory;" the two fountains playing at its base are classed with the largest in the world, their capacity being 20,000 gallons per minute.

Near this monument are bronze statues of General George Rogers Clark, William Henry Harrison, ninth President of the United States, Governors James Whitcomb and Oliver Perry Morton, all conspicuous in the history of the state. The park reservations of the city comprise 1,554 acres including Riverside Park, extending five miles along both sides of the river, Garfield, Brookside, University and Military parks; all the parks of the city will be connected eventually by a system of boulevards, several miles of which are already in use. The river is spanned by six bridges of more than ordinary beauty. North of the city is located the Benjamin Harrison Army Post. The motor speedway of Indianapolis, with parking facilities for 10,000 automobiles, is the finest of its kind in the United States, and great numbers of people are attracted by the motor races held here annually.

Buildings and Institutions. The most imposing of the city's numerous handsome buildings is the State Capitol, built of Indiana limestone at a cost of $2,000,000; a fine statue of Thomas A. Hendricks ornaments the grounds. The city hall, Federal building, county courthouse, Masonic Temple, John Herron Art Institute and the Y. M. C. A. and Y. W. C. A. buildings are modern structures. The Traction and Terminal building is the largest exclusive interurban station in the world. The Union Station, Maennerchor Club, and the Coliseum are also worthy of mention. To maintain its reputation as a convention city, Indianapolis has a number of fine, well-equipped hotels, the Claypool, Severin, Grand, English's, Washington and Denison being the most widely known.

Besides the public and parochial schools, including three high schools and a normal training school, there are state schools for the deaf and the blind, Butler College, the medical department of Purdue University, Indiana Dental College, Indiana Law School, Indiana Central University, the University of Indianapolis and Winona Technical Institute. The public library contains more than 100,000 volumes. Here also is located the Indiana Prison for Women, and in the vicinity is the Indiana Central Hospital for the Insane. All denominations find places of worship among over 180 churches of the city.

Commerce and Industry. The excellent shipping facilities of Indianapolis and its nearness to vast coal mines and to natural gas and oil fields have helped to make the city a leading industrial center. There are over 1,200 manufacturing plants, more than 100 of these and the Union Stock Yards being located on the Belt Railway. The grain elevators have a capacity of 1,000,000 bushels. Grain, live stock, meats and the products of its extensive manufacturing industry comprise the chief articles of commerce. The wholesale business is enormous. In the building of automobiles, Indianapolis ranks second only to Detroit among the cities of the United States. It is the largest live-stock center in the Ohio Valley, and slaughtering and meat packing are its leading industries. There are iron works of all kinds, flour, grist and lumber mills, furniture, [illegible]

ing, carriage and wagon factories, and printing and publishing houses.

History. Indianapolis was settled in 1819 and was named in 1821. In 1824, when the seat of government was removed from Corydon, it became the state capital; at this time Indianapolis had only 600 inhabitants and one street. It was incorporated for the first time in 1832. With the construction of the first railroad in the state in 1847 the growth of the town began, and in the same year a city charter was granted. Further impetus was given the city's development by the introduction of natural gas in 1889. This factor in its commercial growth declined, however, and was replaced by a large yield of coal from the vicinity. The city was one of the first in the United States to use electricity for lighting. Mars Hill is a recently-organized industrial suburb of Indianapolis. J.S.C.

Consult Hyman's *Handbook of Indianapolis.*

INDIANA UNIVERSITY, at Bloomington, is one of the two universities supported by the state. The other is Purdue University (which see). Indiana University was founded as a state seminary in 1820, as the state college in 1828, and as the state university in 1838. Numerous land grants and state appropriations have been made for its support, and in 1916 the productive funds amounted to $750,000. Its income in 1915-1916 was $639,291.

Indiana University includes the college of liberal arts, school of education, graduate school, school of law and school of medicine. The institution is co-educational, and tuition is free to residents of the state. In the school of medicine the last three years of work are done in Indianapolis. The faculty numbers 232, and the student enrolment in 1915-1916 was 2,672. The library contains about 110,000 volumes. W.S.B.

INDIAN HEAD, the judicial center for Qu'Appelle district, Saskatchewan, situated in the southeastern part of the province, forty-three miles east of Regina, the capital. The Canadian Pacific Railway serves the town. It is located in a rich grain and lumber district, and the industries of the town are largely dependent on these resources. There are ten grain elevators, also flour mills, lumber yards and planing mills. Indian Head has a high school, a public library, a Dominion experimental farm and a forestry farm. The population, chiefly Canadian, was 1,285 in 1911; in 1916, estimated, 1,500.

INDIAN HEMP. See HASHISH.

INDIAN MALLOW, *mal'o,* or **VELVET LEAF,** or **STAMP WEED,** is a weed of the *Malva* family, a native of Asia, and grows to the height of four feet. Farmers of nearly all lands find this weed a source of great trouble, especially in the cornfields. It is a perennial (see PERENNIALS); its leaves are heart-shaped and velvety in texture, and its flowers, of bright orange-yellow color, are about half an inch broad. The fiber of the plant is almost as strong as hemp, and in many species of the mallow it is utilized for textile purposes.

INDIAN MYTHOLOGY, *mi thol'o ji.* The Norse myths and the Greek and Roman myths, with all their antiquity, do not date back as far as the myths of India. Some scholars have been led, by occasional resemblances between Indian and Greek mythology, to believe that the latter was an outgrowth of the former; that is, that the Greeks and Hindus were at some prehistoric time in contact, and that the myths continued to show that fact after all memory of the contact had died out. The weight of authority, however, rests with the theory that the resemblances are due to the natural tendency of primitive peoples, confronted with similar conditions, to invent similar explanations. Originally the Hindus had many gods, representing all the varying phases of nature, but later most of these gave place to the great trinity of deities, *Brahma, Vishnu* and *Siva.* For the character of these three, and their influence on the life of the people, see articles BRAHMA; VISHNU; SIVA.

INDIAN OCEAN, *o'shun,* one of the great oceanic divisions of the world, reaching from Africa eastward to the East Indies and Australia, and from Asia southward to the Antarctic Ocean. The peninsula of India divides it into two great basins in the north—the Arabian Sea and the Bay of Bengal. The Indian Ocean is fed by several large rivers, the chief being the Indus, Brahmaputra, Irrawadi, Salwin, Ganges, Chat-el-Arab, Tigris-Euphrates and the Zambezi. The principal islands in its waters are Madagascar, Mauritius, Ceylon, Reunion, Rodriguez, Socotra, and the archipelagoes of the Andamans, Nicobars, Mergui, Maldives and Laccadives. While the winds on this ocean are usually gentle, hurricanes sometimes sweep over it. The northeastern part is the deepest, where soundings of 20,340 feet have been made. It averages about 10,970 feet in depth. For comparative sizes and fuller description of the seas of the world, see OCEAN.

INDIANS, AMERICAN, the "redskins" of romance and history. They were the most picturesque of the primitive races of mankind, though under the influence of civilization they have lost most of this charm. Before the coming of the "pale-face" the Indians of the United States had made little progress in a material way, and were truly "children of the forest," savage in warfare and often relentlessly cruel. Nevertheless they exceeded the European of their day in many of the simple virtues—honesty, reverence for their deities, faithfulness to their standards of virtue, self denial, affection for their kin, and ability to suffer uncomplainingly. Their intelligence, while not directed to the same ends as that of civilized man, was keen. And even the treachery and bloodthirstiness ascribed to Indians were less than those of their Spanish conquerors in Peru and Mexico, and were sometimes equaled by those of the French, English and Dutch colonists of North America.

One who reads Longfellow's *Hiawatha* and Cooper's *Leather-stocking Tales* is sure to feel sympathy and admiration for their Indian heroes. Though Cooper was accused of portraying the natives with good qualities which they did not possess, his work is defended by those who know the red men best. The history of William Penn and his followers, and of the Hudson's Bay Company, which traded over all Canada for more than two centuries with never a serious break with any tribe, proves that the Indians were not treacherous in their dealings with those who treated them fairly.

Physical Characteristics. The poetess Lydia Huntley Sigourney, who speaks of the Indian advancing to greet the Pilgrims—

> "With towering form and haughty stride,
> And eye like kindling flame,"

is picturing the traditional native of Eastern North America. The Indian, wherever found, has as distinguishing features the straight black hair, the broad face which gives the effect of high cheekbones, the striking aquiline nose, the slightly Chinese slant of the eye, and the scant beard. Strangely enough, considering the universal employment of the name red man, the Indian is less red than his white neighbor; his complexion is in truth brown, sometimes a very dark shade.

Origin. No one knows where the Indian came from, or how long he has inhabited this continent. By most scientists he is believed to be descended from the tribes of Central and Northeastern Asia, for the two resemble each other in nearly every physical character. Stories once widely believed, that the Indians are descendants of the lost Hebrew tribes or of shipwrecked Europeans, have been proved impossible, for the Indian languages are absolutely different from other tongues and must have been spoken for thousands of years. The generally-accepted theory is that the natives of America crossed from Asia at Bering Strait, or farther south, by a passage which has now disappeared.

Numbers. Anglo-Saxon North America contains but a small fraction of the Indian race. In the United States, Canada and Alaska there are about 400,000, the survivors of a population estimated to have been a million before the arrival of the white man. Mexico has nearly six million Indians of pure blood, and more than that number of inhabitants partly Indian. South America's Indian population has never been counted, but is greater than North America's and, like Mexico's, is largely mixed with European blood. In Canada the number of Indians is growing smaller, but in the United States, while rapidly decreasing for a hundred years, has been increasing since the beginning of the present century, if we include all degrees of admixture. In 1910 the full-bloods were counted for the first time and found to number 150,053. In 1915 there were 173,747. There is constant intermarriage of Indians and whites, and eventually there will probably be no full-blooded Indians.

South American Types. The Indians whom the Spaniards found in South America represented all degrees of advancement from near-civilization to the crudest barbarism. Those first seen by Columbus, in the West Indies in-

NORTH AMERICAN INDIANS

An early day

Indian camp

A type that has disappeared

A Pueblo bakery

An Indian burial

Hairdressing of marriageable Hopi girl

Palace of old cliff-dwellers

Weaving a Navaho blanket

re a wild stock from the Amazon welling in huts of tropical grasses or es, wearing little or no clothing, posly stone, wooden, and shell impleid depending largely on fishing for . Columbus called them Indians, bethought he had reached the real India. outh on the continent, some of the ere even less advanced, and those of Fuego are to-day in the lowest grade ed society. In Peru, however, the under Pizarro found the Incas, a ith a highly-organized government, tructed massive stone buildings and ed workers in gold, silver and copper, of beautiful cloth, and farmers who d irrigation and fertilizing. Their interestingly told in Prescott's *Conquest of Peru*. The descendants of the sixntury Indians form the greatest part opulation of South America. Some rmarried with the white races, while ed thousands remain in barbarism. Vest Indies the native race has long tically extinct.

co and Central America. As in South the early Indians from Panama to Grande were of many stages of cule Mayas of Yucatan and other southern states of Mexico, as well as of Guatemala and British Honduras, had reached a civilization higher than that of the Incas, but even before the arrival of the conquering Spaniards their political power had decayed and their noble cities were in ruins. They possessed a practical method of writing on paper, and bound their documents in a form resembling our own books. They had an accurate calendar which extends back for a period of twenty centuries, and some knowledge of astronomy. They wove clothing of cotton. The Aztecs, another Mexican people, though not so advanced as the Mayas, attracted more attention from the Spaniards because of their military power. Prescott's *Conquest of Mexico* tells us what the early Spaniards learned of them, but one who reads the book should know that such titles as *king, queen, noble* and *prince* were wrongly applied to the influential natives by the European conquerors, who failed to understand the Indian system of government and chieftainship. The writing of the Maya, Aztec and other Mexican races is as yet, except in a few instances, not fully understood. Unfortunately, the early Spanish missionaries, who might have learned the secret from the natives, burned most of the native records which came into their hands.

Indians in the United States and Canada

not greatly differing from each other of civilization, the Indians north of aried widely in customs, housing, dress ion. Each of the hundreds of tribes what influenced by its neighbors, and e no such sharp differences as benchmen and Spaniards, or English h. But in a rough way several types stinguished. The *Woods Indians* oce area from the Atlantic to the Wests and prairies; they were the growers nd tobacco, the hunters and fishers, lerful woodsmen whom the English ch first met. The *Plains Indians,* Mississippi to the Rocky Mountains, dering and warlike, hunting the buf'ood. After the arrival of the white became great horsemen. The *Southndians,* of New Mexico and Arizona, Pueblos, or dwellers in villages of *adobe* (ah-do'bay) brick; cliff dwellnomads, or wanderers. In some ways e the most nearly civilized of the rth of Mexico.

The California tribes, separated from the influence of the others by the mountains, were on the whole crude. They were ignorant of agriculture, lived on acorns, seeds and fish, and wore very little clothing. Their neighbors, the Northwest Coast Indians of Washington, British Columbia and Southern Alaska, were also unacquainted with farming, but they built large wooden houses, carved totem poles and paddled about in enormous cedar canoes. The *Plateau Indians,* who dwelt between their kin of the plains and the Pacific coast, but were shut off from them by mountains, were simple people, eating roots and seeds, rabbits and lizards, and dwelling in partly underground houses or brush huts. One more group, comprising the Indians of the Mackenzie basin, is the only one which has a common language. Its people hunt the caribou, which furnishes them clothes and tents, as well as food. See also ESKIMO.

Language. More than half the languages of the world are of American origin. Nearly two hundred languages and fifteen hundred dialects are known to have been spoken by the

Indians. Other languages may have perished when the tribes speaking them were annihilated in battle, for excepting a Cherokee alphabet invented in 1821, none but the Mayas and the Aztecs had any system of writing. Indians speaking the same language did not always live in adjoining regions. Thus, Siouan tribes, besides occupying the great plains and part of Wisconsin were found at Biloxi, Mississippi, and in Virginia and the Carolinas, dwelling in the midst of Iroquoian, Algonquian and Muskhogean tribes. For communication between neighbors of different speech, there was a highly-developed sign language. Some sounds unknown in European languages are common in Indian tongues, but others, such as our indispensable *f* and *r*, are often lacking. The grammar of the various Indian tongues is very complicated.

The Spanish spoken in South America contains many Indian words, and our English, besides thousands of names for places, has a number of common native terms, such as tobacco, chocolate, squash, succotash, moose, caribou, hickory, hurricane, hammock, tomato, coyote, toboggan, caucus, mugwump, moccasin, cayuse, etc.

Indian Thought. So different was the Indian way of thinking from that of the European that the pioneers failed to understand their brown-skinned neighbors, and much of what has been told about the original American is erroneous. The name *happy hunting ground*, for the supposed home of the spirits of the departed, is purely a myth of the white man, for the Indian looked upon the chase as difficult labor and thought of heaven as a place where there was nothing to do but dance and sing, play games, eat or gamble. The Great Spirit, too, is an invention of our own, for the Indians seem to have had no conception of God as a single all-powerful being, all objects, both animate and inanimate, being endowed with certain spiritual powers. Nevertheless, they were intensely religious, after their own fashion. Almost every act of their lives was performed as religion prescribed.

For the Indians there was a soul not only in man and the animals, but in every tree and flower, and even in an inanimate object like a canoe. Certain of the birds and animals were counted more powerful and intelligent than men, and, like the deities of the ancient Greeks, capable of influence for good or evil. Most of

the tribes were divided into clans of close blood relations, whose *totem* was a particular animal from which they were often believed to have descended. The sun and the four principal directions, north, east, south and west, were often objects of worship. The *shaman*, a sort of priest, was often the *medicine-man* of a tribe. Sickness was usually supposed to be the result of displeasing some spirit or of witchcraft, and was treated with incantations and prayers.

The Indians have many beautiful and weird legends. That of Hiawatha has a permanent place in our literature, though unfortunately the hero is portrayed as an Algonquin of the Lake Superior region, when he was really a chief of the Iroquois of New York state. Many of the Indian traditions resemble the old Bible stories, particularly those of Joseph, of the passing through the divided waters of the Red Sea, and of the guidance and feeding of the Israelites in the wilderness. Other tales are of the animals building the world, or bringing fire to men, or of tragic romances or mighty achievements of fabled ancestors.

With the Indian the basis of virtue was self-control. To conceal the emotions and to endure torture unflinchingly was required of each. Gambling was believed an excellent pastime because it gave the loser an opportunity to display his fortitude, especially if he lost everything he possessed. Among the Iroquois theft and other crimes are said to have been so infrequent that there were no rules for punishment, and an Indian always kept a promise, no matter what the consequences to himself. It will thus be readily seen why most white people inspired in the Indian the thought of distrust.

Government. Perhaps because each man governed himself with respect for the rights of his neighbors, elaborate organization of the Indian community was unknown. The chiefs as a rule had little power of their own, but carried out the will of the tribe. The chieftain's office was not hereditary in the European fashion, though a man's successor was usually of his own family. His election was sometimes by the women of the tribe. Each tribe was a nation in itself, with its own lands clearly bounded by treaty with its neighbors. Besides the confederation of Incas and Aztecs which the Spaniards looked upon as empires, there existed a remarkably-organized union among the Iroquois, called the Five Nations, and later the Six Nations.

War was not frequent among the Indians before the arrival of white men. But as the coast areas were occupied by the newcomers from over the ocean, the natives were crowded toward the interior. Each tribe encroached upon the lands of its western neighbors, who, if defeated, were in turn driven farther inland. To this almost continuous strife the intrigues of the Europeans added. The French, to gain the favor of the Algonquins, aided them against the Iroquois, with the first guns known to the natives. The English then took the side of the Iroquois. In the War of 1812 the British incited the tribes to attack the Americans, and in later days individual white outlaws stirred them to frequent fighting.

THE BABY

How the "papoose" is carried on the back of the mother, even to-day, in the Northwest. The illustration is from a photograph taken in 1916.

Ceremonies featured by the smoking of the calumet, a stone pipe, marked the beginning and end of war, which could only be declared by a council of all the men and women in the tribe. The warriors daubed their bodies with bright paint and donned war-bonnets of eagle feathers. The type of bonnet worn by the old brave in the illustration at the head of this article frequently has a queue of feathers extending nearly to the ground. Of course all customs varied from tribe to tribe, so that what is said of one tribe or group of tribes is not necessarily true of another.

In an Indian community no individual owned land, but the right of each to the plot which he cultivated was respected. A man's weapons were his own, but generally the tools and often the food, and among the tribes of the plains even the tepee, belonged to the women. Personal belongings were buried with their owner, that their souls might accompany his to the future home. Other property was distributed in the tribe or bestowed upon heirs. A man's children generally belonged to their mother's clan, and they inherited from her brothers instead of from their father. Wealth was sometimes an honor, but generosity was still more esteemed. The most common form of money was *wampum*.

Agriculture and Industry. It is a mistake to regard the Indians merely as fishers, hunters and fighters. North America has never been as thoroughly a country of farmers as it was before its discovery by Europeans. It is said that corn must have been developed from grass by many centuries of cultivation, and tobacco, beans, squashes, pumpkins, sweet potatoes, peanuts, gourds, sunflowers and cotton were raised by many of the tribes. Irrigation was extensively practiced in the Southwest, and some of the tribes of the Canadian and New England coasts fertilized their fields with uneaten bits of fish. Agricultural implements were of the rudest character of wood, with perhaps a stone, shell, or bone digging point.

In basket-work and pottery most of the tribes were skilful, and many practiced weaving. Of metals those north of Mexico knew little, though copper was crudely mined and melted and hammered in the Lake Superior

CRADLES

(*a*) Moki wicker cradle
(*b*) Apache woman carrying child
(*c*) Ute cradle
(*d*) Arikara carrying basket for the "papoose"

The illustrations are drawn from specimens in the National Museum of the United States, at Washington.

regions, and after the appearance of the Spaniards some of the Indians along the Mexican border became skilful silversmiths. Decorations were nearly always symbolical, because of the belief that something of the power of the animal or other deity represented was present in the symbol. As a rule women did the

WORLD BOOK

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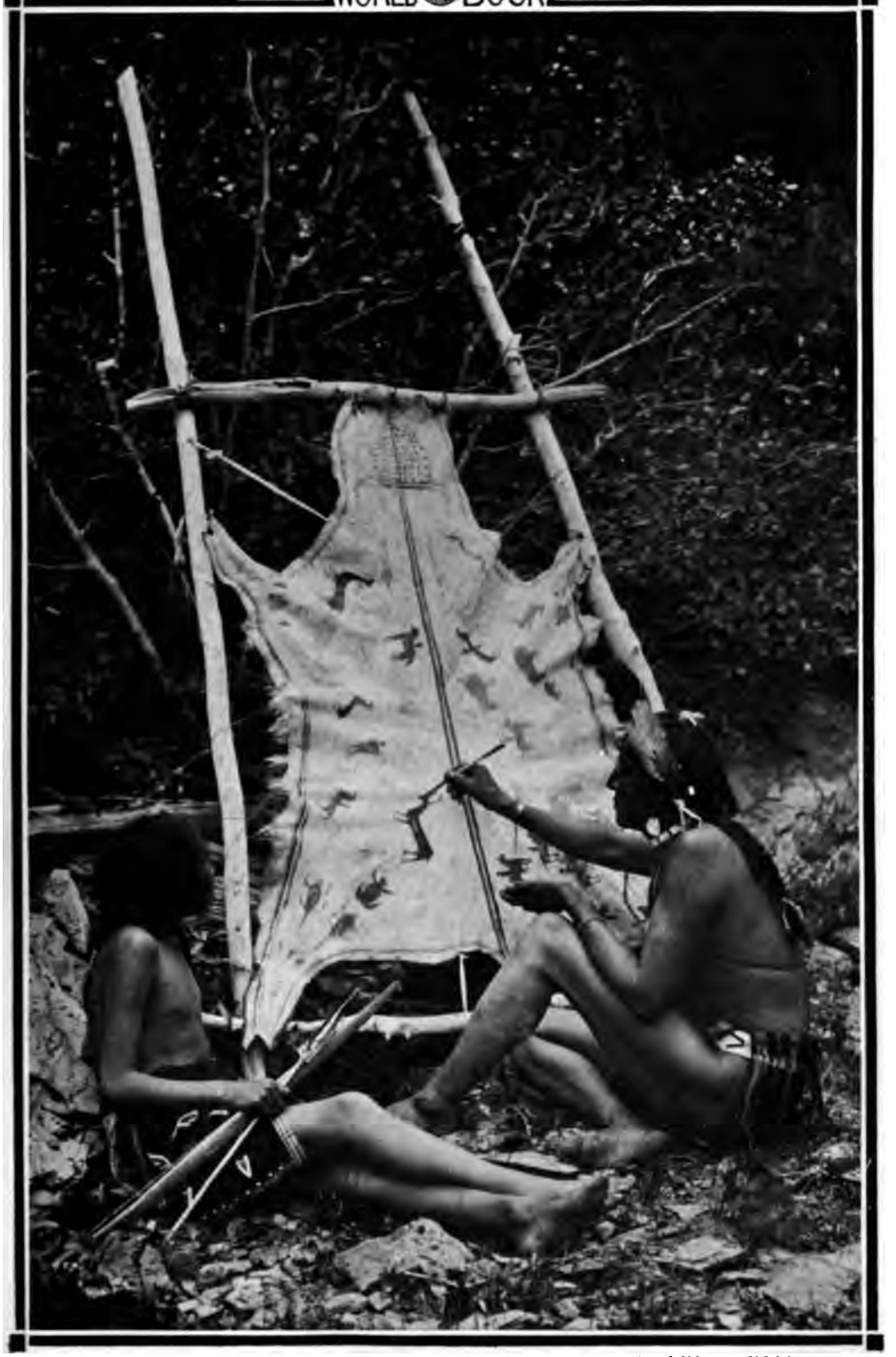

AN INDIAN ARTIST.

He prefers animal life, as did his ancestors, ignoring the beauties of nature.

WORLD BOOK

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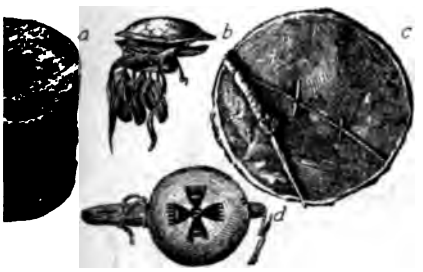
HELPING MOTHER.

Little Lone Star taking care of his papoose brother. In the Blackfeet Reservation, Glacier National Park.

labor, both in the field and in the ut men made stone arrowheads, bows er implements of war or the chase, and d decorations which were connected ligion. See the picture accompanying cle Bow AND ARROW; FIRE; POTTERY.

n transportation was of the crudest type. as not a wheel of any character on the nt before the coming of the white race. were unknown till introduced from , and even then the Indian vehicle was g shown in the color plate. The Es-



DRUMS AND RATTLES
x drum
eblo turtle shell, with hoofs of goats or ep; fastened to the knee when dancing
mbourine drum of the Menominee Indians
eblo painted gourd with wooden handle
rations drawn from specimens preserved United States Bureau of Ethnology.

nd their neighbors employed dog sledges aveled on snowshoes. On the water, of birchbark or hollowed logs were the al conveyance, but in California a crude as made by fastening rushes together, the Missouri River tub-shaped frames vered with skins.

itecture. The tepee, or tipi, the conical hich we ordinarily think of as the In- home, was not in general use except on ins. Villages in the Southwest were con- d of stone or of adobe, a sun-dried brick in round balls before the knowledge of icks was gained from the Spaniards. atives of the North Pacific coast built of rough boards, and those of the At-lantic, oblong structures covered with bark. Several families lived in each of these; there was generally a large council hall, and sometimes even a men's club house. Many villages were protected by stockades. For a description of the Indian mounds, see the article MOUND BUILDERS.

Dress. Shirts and leggings of deerskin were in most tribes the main clothing for both men and women, but the tribes of the Southwest wove cotton garments and made robes of plaited rabbit-fur long before the arrival of the whites. Blankets or robes were worn everywhere for warmth or for dignity, and some really beautiful patterns were developed.

Like all primitive races, the Indians were fond of personal adornment. They cut their clothing into fringe at the edge, and frequently embellished it with feathers or elk's teeth. On festive and warlike occasions they painted both face and body. In some tribes tattooing was practiced. Necklaces of shells, ear rings, and sometimes lip and nose jewelry were worn, and men as well as women were proud of long hair.

Amusements. The old idea of the Indian as a man of constant dignity and haughty silence was far from true. Though quite theatrically solemn on occasions of importance, the Indian was fond of games and sports and laughter. His leisure was spent in amusements ranging from guessing to several forms of ball games, on all of which he gambled. The Indian women played dice games and football, while the children, like children the world over, imitated the occupations of their parents in playing war or hunting with bows and arrows, or in keeping house with dolls. Dancing was a universal amusement, but was oftener a religious ceremony. It was accompanied by the music of drums and singing in very complicated rhythms, often rendered more difficult by the adoption of a measure of time for the voices different from the drum-beat.

The Indian and Civilization

se United States and Canada the Indian dly absorbing the best elements of the man's civilization, aided by the paternal t of the national governments. Unfor- y this has not always been true. As ontiers of European settlement were l westward the more adventurous and less lous elements of the new population onstantly in contact with the natives. The Indian's worst enemy has been the white man's whisky. A half century ago the traders on the plains could add four gallons of water to a gallon of alcohol and trade the mixture to an Indian for forty buffalo robes each worth five dollars, the winter's work of the women of the tribes. In Canada the scrip (certificates of right to free land) which the government gave to the half-breed Indians was often trans-

ferred to white men in return for whisky. In both countries the sale to the Indians of whisky or its substitutes is now heavily punished by law.

In the United States there have been hundreds of wars with the Indians, the last ending with the surrender of the Apaches in 1886. Many of these were caused by unjust actions of white men, or by such harsh measures of the government as the forcible removal of a tribe from one home to another. Canada was more successful in its treatment of natives, partly because the early French settlers were more friendly with them than the English, partly because of the Hudson's Bay Company's fairness in dealing with them, and also no doubt because of a more cordial attitude of the government in the early days. The only outbreak of importance since colonial times was Riel's Rebellion of half-breeds in 1884 (see RIEL, LOUIS).

Nearly forty per cent of the Indians of the United States still maintain their tribal relations, treated as nations within the nation. But since 1887 the policy of the government has been to abolish the independence of the Indians and to make them citizens of the states in which they live. This is being brought about gradually through education and through individual division of the tribal lands. In Canada the natives are still kept apart, in most instances; some of the provinces do not permit them to become citizens.

Official relations of the United States with Indians began during the Revolution, when agents were appointed to live among the tribes and secure their friendship. Afterward, as civilization pressed westward, the Indians were called upon to cede lands around trading posts, then others more distant, and finally all but those set aside as reservations, and even these have now largely disappeared. Till 1849 the War Department was in charge of Indian affairs; since then there has been assigned to them a bureau in the Interior Department, for which Congress annually appropriates more than $10,000,000.

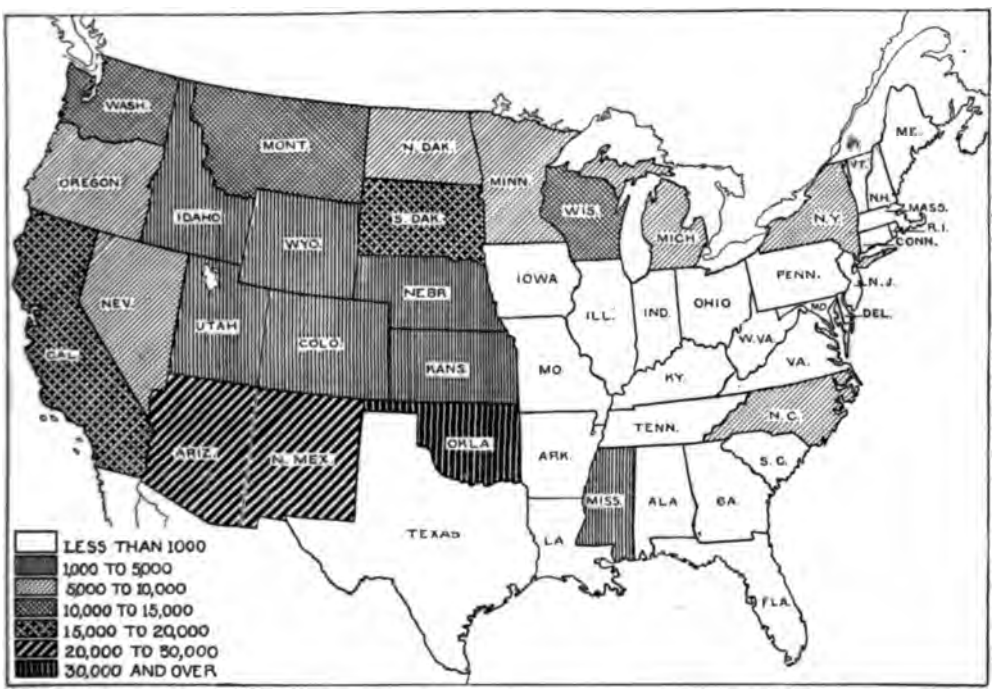
TYPES OF COSTUMES IN 1916

The picturesque Indian of the past has not entirely disappeared. The illustration is from a photograph taken in Northern Idaho in 1916.

The government's policy has on the whole been generous and just, though its agents have not infrequently been tyrannical and unfriendly to their charges. The main criticisms of official treatment of the Indians are that infertile lands have sometimes been assigned to them and that they have been forced to abandon their old homes for new when white men coveted them.

The British North America Act reserves to the Dominion Government the control of

Indian affairs throughout Canada. All matters relating to the Indians are in charge of a Department of Indian Affairs, at whose head is a superintendent-general, usually the Minister of the Interior. The interests of the Indians are carefully guarded by law; all property held for them can pass from their possession by sale or lease only by their own consent, and the proceeds of all such transfers are invested for their sole advantage. They are enfranchised whenever they can meet qualifications imposed by law. In Manitoba, British Columbia, and the Northwest Territories they are denied votes, but in the other provinces if an Indian possesses and occupies a distinct tract of land in an Indian reserve, the improvements on which are worth at least $150, he is qualified as a voter. Agents live on the Indian reserve and government inspectors visit each agency from time to time to see that the interests of the Indians are protected.



DISTRIBUTION OF INDIAN POPULATION
The Indians of the United States, as they were located in 1910.

Indian Education. Since 1819 in the United States and since Confederation in Canada in 1867 there has been systematic government supervision of Indian education. Earlier instruction of the natives was by missionaries.

About 25,000 Indians attend school in the United States. Besides the day schools and the boarding schools situated on the reservations, the government maintains the Carlisle School (see UNITED STATES INDIAN INDUSTRIAL AND TRAINING SCHOOL) and a few others in the non-Indian portions of the country, where the pupils may come in contact with civilization. The average annual expenditure on all the Indian schools is about $150 for each pupil. The Five Civilized Tribes in Oklahoma maintain their own schools.

The policy of the government provides for each Indian, first a thorough knowledge of elementary subjects such as English, arithmetic, geography, and United States history, and then for the boys, training in a special trade or profession, and for the girls, instruction in home-making.

In Canada the number of Indians at school is usually about 7,000. There are more schools under government supervision than in the United States, partly because the natives are more widely distributed. Most of the schools are controlled by one Church or another, whereas in the United States the government now extends no aid to denominational schools.

The annual appropriation is about $80 per pupil.

American Indian Day. On May 13, 1916, was celebrated for the first time an Indian national holiday, which every person of Indian ancestry was called upon by the Society of American Indians to observe as a day "set apart as a memorial to the red race, and a wise consideration of its future." The second Saturday in May of each year will be thus honored in the United States not only in every Indian school and upon every Indian reservation, but in many white communities as well.

Indian Reservations, territories set apart as homes of the Indian charges of the nation, are maintained in both the United States and Canada. In the latter country they are called Indian reserves. White people are prohibited from settling upon them, and no Indian is permitted to pass the boundaries of his reserve except on proper business or by consent of the agent in charge. The government exercises paternal care over the residents, protects them in their legal rights, conducts schools, and teaches the art of civilization. As rapidly as possible the Indians are induced to abandon tribal relations and adopt the habits of the white race.

The amount of land in use for Indian reservations is constantly changing. In some cases additions are made, in others there are

RESERVATIONS, 1916

withdrawals for purposes of conservation (which see). Further, under the policy of absorption of Indians into the nation the territories of the more civilized tribes are being divided and opened for white settlement. When it is decided to close a reservation in this fashion, each member of the tribe is allotted a reasonable amount of ground, and the remainder of the holdings is sold and the proceeds paid to the Indians. The members of the Five Civilised Tribes of Oklahom have in this way become fairly wealthy.

Reserves in Canada are several times th number of reservations in the United State many of them containing only a few acre This is because the Dominion government ha never followed the policy of concentrating it Indians. E.S.C.

Consult Brooks' ***Story of the American Indian*** Guerber's ***Story of the Thirteen Colonies;*** Wil son's ***Myths of the Red Children.***

Related Subjects. For more detailed infor mation as to the various tribes, the outstandin single figures among the Indians, and certai phases of their life, the reader is referred to th following articles in these volumes:

TRIBES

Algonquian Indians	**Modoc**
Apache	**Mohave**
Arapaho	**Mohawk**
Assiniboin	**Mohican**
Athapascan Indians	**Munsee**
Aztec	**Muskhogean Indians**
Bellacoola	**Narragansett**
Blackfoot	**Navaho**
Catawba	**Nez Percé**
Cayuga	**Ojibwa**
Cherokee	**Oneida**
Cheyenne	**Onondaga**
Chickasaw	**Osage**
Chinook	**Ottawa**
Choctaw	**Pawnee**
Comanche	**Pequot**
Conestoga	**Pima**
Cree	**Ponca**
Creeks	**Potawatomi**
Crow	**Pueblo**
Delaware	**Quapaw**
Five Civilized Tribes	**Sac**
Five Nations	**Seminole**
Flatheads	**Seneca**
Fox	**Shawnee**
Huron	**Shoshonean Indians**
Illinois	**Shoshoni**
Inca	**Siouan Indians**
Iowa	**Sioux**
Iroquoian Indians	**Tuscarora**
Kaw	**Ute**
Kickapoo	**Wampanoag**
Kiowa	**Winnebago**
Klamath	**Yakima**
Kootenay	**Yaqui Indians**
Makaw	**Yuma**
Mandan	**Zuni**
Maya	

FAMOUS INDIANS

Atahualpa	**Osceola**
Black Hawk	**Pocahontas**
Brant, Joseph	**Pontiac**
Geronimo	**Powhatan**
King Philip	**Sitting Bull**
McGillivray, Alexander	**Tecumseh**
Massasoit	**Uncas**

GENERAL TOPICS

Calumet	**Totem**
Sun Dance	**Wampum**

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BLACKFOOT INDIAN CAMP.

Present-day scene in Glacier National Park. The squaws do the work, while the braves "sit around." At right: A pair of lovers; he sits, by right of centuries.

N SUMMER, the name usually ap- a short season of fair, warm weather in the late fall in temperate lati- 1 the United States and Canada the may change during October or No- in place of autumnal cold, the genial 1 of warm, hazy, summery days are time. The same phenomenon is ex- in Europe, the seasons there being called "Saint Martin's Summer," "Old Summer," or "All Hallow Summer." 1 *Indian summer,* however, has come ıst universal use. At the time of the ummer the air is usually dry, and aining leaves of trees and plants hrivel and fall off.

igin of the term is uncertain. Many have been advanced, but none with ee of authority. That the Indians such a season to the first Europeans n America, who gave it the name, is but highly improbable, as the term eared in books and manuscripts as 794.

N TERRITORY, *ter i to'ri,* formerly y of the United States, set apart by as a residence for the Indian tribes been forced out of Georgia, Florida r Southern states. Between 1820 and

INDIAN TERRITORY
mer Territory, now a part of Oklahoma.
s of the nations were as follows:
)kee (4) Chickasaw
: (5) Choctaw
ıole

Cherokees, Creeks, Chickasaws, Choc- Seminoles gave up their eastern lands pted their new homes on condition be allowed to maintain their tribal nts. These five tribes, later known /e Civilized Tribes, or Nations, estab- vernments like those of the states, 1 a governor and a legislature; they l enforced their own laws, maintained 1 school systems and generally con- hemselves as independent nations. ıe Five Civilized Tribes, reservations were set aside at various times for the Modocs, Ottawas, Peorias, Senecas, Osages, Kawa, Comanches, the Apaches and other tribes. Unfortunately, the Indians were too few to hold all the land thus given them, and white settlers, or "squatters," encroached upon them, especially in the western part of the territory. In fact, after the War of Secession, many white men mingled with the Indians, married Indian women, and became influential in the government of the tribes.

It was finally apparent that settlers could no longer be kept out of the territory. In 1889, therefore, the United States purchased from the Indians the western part of the old Indian Territory and in the next year organized it as Oklahoma Territory. The opening of Oklahoma Territory to settlement was followed by an increase in the number of white settlers in what remained of the Indian Territory. By 1900 the whites outnumbered the Indians six to one, and the tribal government became totally inadequate under these conditions. In spite of the original guaranty of tribal independence, the Indians were forced to yield to an act of Congress of 1897, which gave the United States courts jurisdiction within the Territory. In 1898 the Curtis Act, which was designed to transfer property rights from the tribes to the national government, provided for the enrolment of the Indians as citizens and for the regulation of town sites, and it gave the President a veto over acts of the tribal governments. By agreement with the Five Tribes the allotment of land to individuals was begun, and on March 4, 1906, all tribal government ended. Congress then passed an enabling act by which Oklahoma and Indian Territory together could become a state. The state of Oklahoma was admitted to the Union on November 16, 1906, and the Indian Territory ceased to exist. W.F.Z.

See INDIANS, AMERICAN, for the history of the red man in the United States and Canada.

INDIA RUBBER, an earlier name for rubber, but now little employed. Soon after the discovery of America (then called India), Europeans heard of the use of this substance. They called it *elastic gum* until they discovered that lead pencil marks could be erased with it, when they began to call it India rubber. The story of rubber is treated in these volumes under the title RUBBER AND RUBBER MANUFACTURE.

INDICTMENT, *in dite'ment,* in criminal law, is a written accusation against one or

more persons, presented upon oath by a grand jury. The term is derived from the old French word *inditer,* meaning *to indicate,* or *point out.* The object is to indicate the offense with which the accused is charged. The essentials of a valid indictment are that it be presented in the proper district, to some court having jurisdiction over the offense charged; that it be a "true bill," signed by the foreman of the grand jury and by the prosecuting attorney; that it contain a clear description of the crime and the name of the accused, and that it be written in the English language. The form and language of an indictment are prescribed by law. One cannot be convicted of a greater offense, at the time of trial, than that charged in the indictment which is the basis for trial. Practically the same procedure is followed in the United States, England and Canada. See JURY AND TRIAL BY JURY.

IN'DIGO, a deep blue dye used so commonly in calico-printing, in coloring silks and woolens and in imparting a slight tint to delicate white fabrics that the expression "blue as indigo" has passed into a proverb. Formerly it was produced in large quantities from plants of the pulse family; by far the largest part came from the East and West Indies, and especially from Bengal. Indeed, the very name is but a form of the word *India.* Centuries ago the European traders brought back with them from India this blue dye, and to this day the same simple methods of manufacture which prevailed then are in use in that far-away country.

INDIGO
Branch, flower and beans.

The straggling plants, which reach a height of about six feet, are cut just before their blossoms appear and are steeped in water in great airless vats for twelve or fifteen hours. The liquid that results is almost colorless, and is known as *indigo white,* but on being stirred violently in an open tank it produces the foamy *indigo blue,* which rises to the top as a scum. Later this sinks to the bottom, and the clear water is easily drawn off. The indigo blue is then collected from the bottom of the tank and dried, and is ready to be sent to market.

When indigo blue is used for dyeing it is converted again into indigo white, and in this form is applied to the fabrics. These are then exposed to the air, and the oxygen has the same effect which it had in the earlier process, and turns the white to blue. In printing calicoes with indigo blue the cloth is first dyed a plain blue, and the white pattern is produced by bleaching. About 1740 indigo began to be produced in considerable quantities in Georgia and North Carolina, but the industry did not survive the War of Secession. Indigo is sometimes used as bluing.

Coal Tar Indigo. Since 1897 much indigo blue has been produced from coal tar, and the discovery of this process is regarded as one of the greatest victories of industrial chemistry. Fifteen years after artificial indigo first appeared on the market it had practically driven out the natural dyestuff even in the countries where the indigo plant is produced. Natural indigos contain only twenty to ninety per cent of the coloring matters, and this is not all indigotin. Artificial indigo is practically pure indigotin and therefore more uniform in quality than the natural dye. J.F.S.

INDIGO BIRD, or INDIGO BUNTING, a North American bird of the finch family. It ranges from Ontario, Quebec and New Brunswick as far south as the Gulf states, and winters from Southern Mexico and Cuba to Panama. Three or four pale, bluish-white eggs are laid in a nest of grasses, leaves and bark. The male is a bright indigo blue, clear on the head and greenish on the back; the female is a warm brown with obscure streaks on the back. The indigo bird trusts mankind and is easily tamed. It is a tireless songster, and continues its warblings long into the summer after most birds have ceased to sing.

IN'DO-CHI'NA, the name given to the provinces in the southeastern peninsula of Asia, extending northwest to southeast between the Gulf of Tongking and the Gulf of Siam. The region is sometimes called *Farther India,* and embraces Annam, Burma, Siam, Cochin-China, Tongking, Cambodia and Laos. For detailed treatment of the various parts of this region, the reader is referred to the following articles in these volumes:

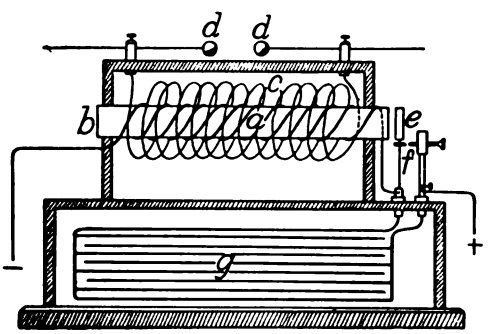
Annam	French Indo-China
Burma	Malacca
Cambodia	Siam
Cochin-China	Tongking

INDOOR BASEBALL. See BASEBALL, subhead *Indoor Baseball,* at end of article.

INDUCTION, *in duk'shun,* ELECTRIC. Any conductor of electricity may be electrified by placing it in an electrical field, that is, by placing it near an electrified body. This effect may be shown very simply by electrifying a rod of sealing wax or vulcanite by rubbing it with a woolen cloth and then placing the rod near two metal balls which are in contact on a glass plate, which is an insulator. The metal balls then become electrically charged. The ball that is nearer to the negative charge on the sealing wax is positively charged; the ball that is farther from the rod is negatively charged. If the balls are separated while the rod is near them each ball holds its charge. A piece of sheet rubber (a non-conductor) may be used in moving the balls in order not to conduct away the charge through the hand. The electroscope (which see) can be used to prove that one ball has a positive and the other a negative charge. The process illustrated by this experiment is *electric induction.*

If a positive charge is brought near an electric conductor the conductor has two equal charges induced upon it, one positive, the other negative. The negative charge is on the part of the conductor nearest to the positive charge which induces it. See ELECTRICITY; INDUCTION COIL.

INDUCTION COIL, a device for increasing the strength of an electric current. It consists of an inner coil of coarse wire *a,* and called the *primary;* a core *b,* made of soft iron wires; an outer coil *c,* made of fine insulated



INDUCTION COIL
The figure is explained in the text.

wire and called the *secondary;* two points or knobs *d d* and a vibrating apparatus *e f* called the *interrupter,* for making and breaking the current that is sent through the inner coil. When the points *e f* are brought in contact a positive current enters, flows through the inner coil and back to the battery. The spring that holds these points together has a piece of soft iron on its upper end directly opposite the end of the core *b.* When the circuit from the battery is closed, this core becomes an electromagnet and draws the iron towards it, opening the circuit at *e.* The core then loses its magnetism and the spring pulls the piece of iron back, forming the connection with the battery again, closing the circuit and starting the whole process over again. The circuit is opened and closed with great rapidity.

The wire in the secondary coil is very long, and the rapid opening and closing of the circuit in the primary coil induces in it a current of much greater force than that in the primary coil. In the largest induction coil ever made, the secondary coil was 280 miles in length and was wrapped about the primary coil in 340,000 turns. When operated with a battery of thirty cells, it caused a spark forty-two inches long to leap between the opposite ends of the coil. The strength of the coil is measured by the distance between the points *d d* across which a spark will pass.

The chief uses of induction coils are for producing X-rays and in wireless telegraphy. See ELECTROMAGNETISM; ROENTGEN RAYS; TELEGRAPH, subtitle *Wireless Telegraph.*

INDUCTIVE, *in duk'tiv,* **METHOD,** that method of instruction which proceeds from individual ideas gained through observation to the formation of definitions, classifications and rules. It is also called the method of observation and the method of discovery. At first children gain their knowledge by observation and experience; hence all children learn inductively. By comparison of ideas they gradually form general notions. The child first gains an idea of his own dog, for instance, then by observation of other dogs he forms the idea *dog.* This idea does not mean merely his dog, but any dog, that is, it is a class or general idea. In a similar manner children learn the principles of number and many of the definitions in geography. The inductive method is especially adapted to instruction in the primary grades; it is also the method employed in scientific discovery, and it is valuable in beginning the study of most new subjects.

The inductive method, however, should not be carried too far. The child should be led to apply his knowledge as fast as he gains it, and to proceed by the inductive method in gaining every new idea would be a waste of time. In the study of algebra, geometry or grammar, for instance, much more can be ac-

complished in a given time by beginning with definitions and rules than by observation and experiment; hence all right methods of teaching begin with the inductive method with young children and gradually lead to the deductive method (which see).

INDULGENCE, *in dul'jens,* in the Roman Catholic Church, a remission of temporal punishment due to actual sins, the guilt of which is already forgiven. In the earlier ages the punishment for sin was more severe than at the present time, when definite forms of prayer are the most common means of obtaining indulgences. As in the early Church, so now, people still pray, fast, give alms and occasionally make pilgrimages to obtain the benefits of indulgences. Indulgences are of two kinds: *plenary,* which is a full remission, and *partial,* which, as the name implies, only partly remits the temporal punishment due to sin. Abuses in the manner of granting indulgences constituted one of the causes of the Protestant Reformation. See REFORMATION. G.W.M.

IN'DUS, one of the three greatest rivers of Northern India, rises in an unexplored region in Tibet, north of the Himalaya Mountains, at an elevation of 18,000 feet. Its drainage basin is estimated at 372,700 square miles, over twice the area of Ohio, Indiana, Wisconsin and Illinois, and its total length at a little over 1,800 miles. The Indus has five tributaries—the Shayok, the Kabul, the Punjab, the Sutlej and the Chenab—each navigable for inland craft to the mountains. The delta, which extends along the Arabian Sea for 125 miles, is not very fertile, and is almost entirely devoid of trees. The cultivation of the arid plains through which the lower Indus passes is dependent upon the annual overflow of the river from the mountains and artificial irrigation fed by that overflow. Thus the river is of greater importance for irrigation than for transportation. Its value as a navigable route for traffic has been greatly lessened since the construction, in 1878, of the Indus Valley Railway along its course, and its navigation is now confined chiefly to native craft. The Indus abounds with fish of excellent quality, and is infested by crocodiles. It is the "King River" of Vedic poetry.

INDUSTRIAL ART. In this world of ours everything changes. Our clothes get out of fashion before they are worn out. A new building replaces an old one, and the aspect of the whole neighborhood is changed. If we go away from home for a visit we are sure to notice changes when we return—the kitten has grown to be a cat, the corn is in tassel, the baby has learned to walk, and father has had another birthday. When school opens in the fall, there is probably a new teacher, or there are new pupils, or new studies. There is sure to be *something* new, for time never stands still, and as time flies, it works changes.

Ideas, as well as people and things, are constantly changing, too. Ideas are thoughts, and everybody knows how quickly thoughts can become completely transformed. We "change our minds" about many things, as we grow older. We used to burn witches, because we thought that human beings were sometimes "possessed" by evil spirits, which could only be driven out by fire; but now we know that the way to make people good is not to burn them up, and that there are no such things as witches. Each day, too, people are growing wiser about matters of health, and are learning to take better care of their bodies. All these improvements in our ways of living have come about because of changed ideas.

We find that our studies in school are also changing. School is a much more interesting place than it used to be. Nearly every boy and girl now has a chance to learn something besides reading, writing and arithmetic, and even these studies seem to be changing, for now we learn them by new methods that are in themselves attractive. The little folks now learn to read in beautiful books with colored pictures, and they learn to add, subtract, mul-

and divide by playing store and by ing money that for all the purposes of chool store is real.

as about learning to draw and to paint lso changing. We have long spoken of lessons as art, because for many years e have thought that *art* meant only the ng and painting of pictures, or the mod- of statuary and other beautiful forms. now we are learning that art, instead of limited to pictures and sculpture, has a deal to do with everything that is made an. We are hearing about artistic homes, ic clothes, artistic bridges, artistic public ings and artistic factories and railroad ns. In buying certain fabrics or cloths to ade up into gowns, or to be used as cur- or hangings in a house, we find that those ials which are styled *artistic* command a r price, and certain nations in the world ol the markets for dress goods, carpets, china and glassware, metal ware, watches, ry, and a host of other things, because manufactured products are more artistic. ave come to speak of the kind of art is expressed in things, rather than in pic- and statuary, as *industrial art,* because it expressed through the medium of indus- nd manufacture.

erybody should know a good deal about trial art, for this is a great industrial ent, and it is of the highest importance the things which are made here shall be rthy and as beautiful as the things which ade across the ocean. Not everyone is with the genius to paint great pictures, th the talent to draw cleverly, but every- an learn that kind of art that is ex- d in useful things, and this has to do our selections of dress, of house furnish- and our good taste in general. So what ed to study under the topic of *drawing* w modified and changed in our schools et the demands of *industrial art.*

find that it is still necessary for us to much about form and color. We must earn to draw objects, and to understand ws of perspective. But in addition to we must go deeper into the study of , which is the foundation of industrial nd which is governed by principles which e learned as easily as the principles of nar. Indeed, design is something like nar. You know that there are rules govern the use of English, and every- ho pretends to be educated at all should know why it is not correct to say "He has went" or, "Between you and I." People often use good English without knowing much about grammar, but acquaintance with the rules of correct speech never injures the naturally good habit of talking and writing, and frequently we need to know *why* a certain expression is incorrect. It is so with the rules of design. Some people are born with a fine sense of color or proportion, or a general sense of order and fitness. We say that such people have good taste. But there are many people who need to have their tastes cultivated, and the study of design is the very best way to develop good taste in all matters that relate to the use of colors, forms and shapes.

Design is arrangement. Arrangement of any kind is always the result of thought. In placing the furniture in a room we must follow some plan. We cannot put the chairs and tables and bookcases and pictures around in a haphazard fashion. We must place each article where it will be convenient for use, and where it will look well. This thoughtful planning is design. We cannot permit every property owner in a town to place his house or his sidewalk where pleasure suggests, without regard to his neighbor or to the appearance of the street. He must locate his house and his sidewalk in observance of the rules and restrictions which have been laid down in planning the street or the town. Our most beautiful cities are those which have been thoughtfully planned by good architects and landscape designers, who think a project through from beginning to end, and who do not place a single house or tree without regard to other buildings and other plantings that will be done at a later time.

The problems that follow are planned to make clear the meaning of design in its relation to things of everyday use. In working out these problems we shall employ the simplest of materials, and we shall help you to make a number of useful and beautiful articles, as proof that you are learning to understand the laws that govern design and to use intelligently the beautiful harmonies of color.

Problem 1; The Making of a Booklet. Let us take for our first problem the designing, making and decorating of a blank book, in which may be kept pressed leaves of trees, drawings or pictures of birds or flowers, or even a collection of plant leaves.

The first thing to be selected is a suitable paper for the cover. It must be tough in qual-

ity, neutral (grayed or subdued) in tone, and unglazed. Gray manila paper, smooth, heavy wrapping paper, or colored construction paper, may be the stock from which your choice is made. Fold a 9"x12" sheet on its short diameter. You have, in this folded sheet, the simplest form of book cover. Select three or four sheets of 9"x12" white or cream manila paper and fold each sheet separately on its short diameter. Place one sheet inside the other, in book form. Place the little book inside the folded cover. Adjust the pages to fit the cover, open the book at the middle, and place a dot on the crease at the center. Also place dots on the crease about one inch from each end. With a coarse needle and linen thread, sew through the middle dot from the inside to the outside, leaving a two-inch end of thread on the inside of the book. Sew back through the lower dot, out through the middle hole and back through the upper dot, bringing the thread to the middle hole and tying it to the end of the string in a knot, which remains on the inside of the book (Fig. 1).

Fig. 1

For the decoration of the cover let us take a leaf shape for the unit of design—that is, for the shape to be repeated to form, in this case, a border.

By using the device of paper cutting (Figs. 2 and 3) we instantly eliminate the confusing details that enter into the drawing or painting of a leaf. In design, we are interested only in the shapes of things, and so we proceed to cut out, not one, but several leaf shapes, all exactly alike. We therefore fold a slip of paper 7"x2" into a fourfold thickness, as shown in Fig. 4. Fig. 5 shows the process of free cutting. Fig. 6 shows the four leaf shapes, exactly alike, which result from this cutting. Fig. 6 cannot be called a design, or an arrangement, because there is no order or plan observed in placing the leaves. In Fig. 7, however, we see that the mind has been at work, and order is established. The shapes have been thoughtfully spaced and arranged in a row between marginal bands. This arrangement we may call a border. Such a border could be extended indefinitely, if we repeated more shapes, spaced like those in Fig. 7. When a repeated shape makes us feel a certain continuance or movement, we call it *rhythm*. Rhythm, or the apparent movement of related shapes, is one of the important principles of design.

When we repeat related shapes like the leaves in Fig. 7, we see another effect besides rhythm. Between every two leaves there is a space that is a part of the background. If you were to move the two leaf shapes farther apart, the shape of the background space would be wider. If you placed the two leaf shapes so that they touched, the background shapes would again be changed. In designing border rhythms we should try to adjust the repeated shapes so that the background spaces will be beautiful in proportion and in shape. Sometimes we have to add other elements to background shapes in order to make them interesting. You will see how this is done in later problems.

Fig. 2

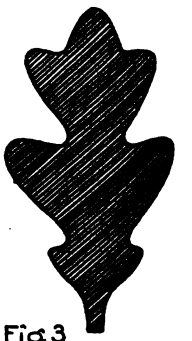


Fig. 3

Nature study through paper cutting

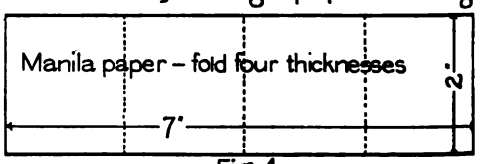


Fig. 4

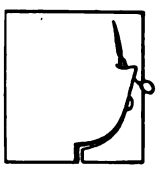


Fig. 5
Free cutting of leaf shape

Fig. 6.
Four design units cut at once

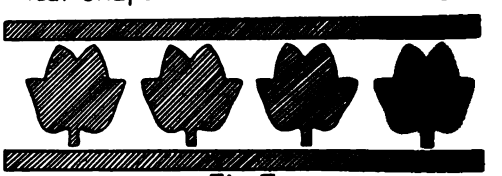


Fig. 7

From paper that is lighter or darker in tone than the cover of your book, cut four leaf shapes in the manner we have just described. Arrange them to form a border rhythm near the top of the front cover of your book. When background spaces and leaf shapes are well

Fig. 8

related, paste the leaf shapes in place. From the same paper, cut narrow strips to form marginal bands, and put them in place. The success of this exercise will depend upon the careful spacing of the units, on the width and placing of the bands and on the neatness with which the work is done.

Another way in which you might decorate your book cover is shown in Fig. 9. Here the cover is ruled into inch squares. In every other square is placed the shape of a leaf. You could use the shape of a bird or a flower if you preferred. A paper pattern of the unit you wish to repeat could be cut from an inch square and used as a pattern in tracing. The shapes should be filled in with strokes of colored crayon, darker than the color of the

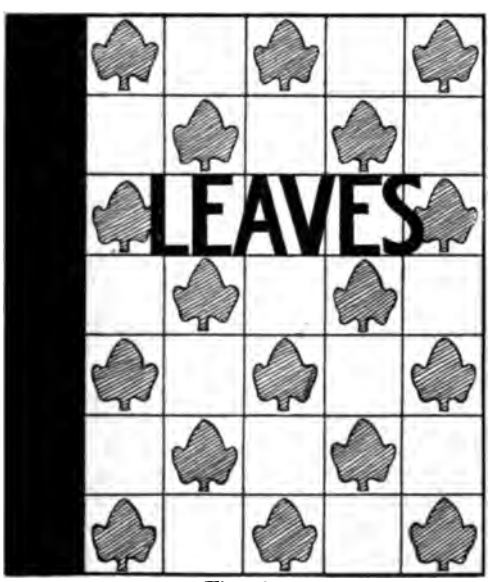


Fig. 9.

cover. The third row of squares from the top should be reserved for the title, such as "Birds," "Flowers" or "Leaves." The letters for the title should be cut from 1"x½" manila paper, as shown in Fig. 8. The letters should be carefully spaced, and pasted in place. Figs. 9 and 10 are suggestions of booklets decorated in this way.

Problem 2; Stick Printed Designs. Most boys and girls like to print with rubber

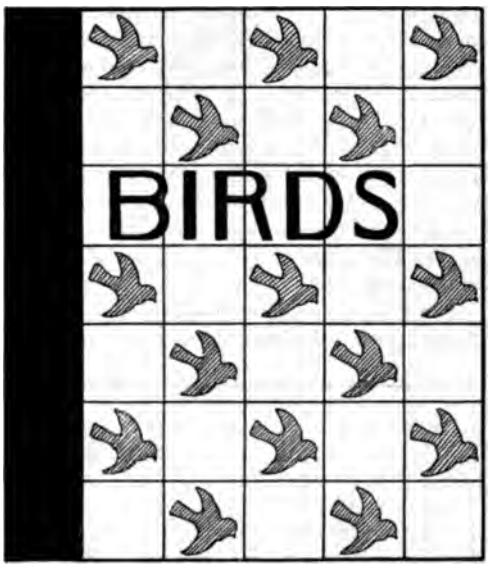


Fig. 10

stamps. It is a quick way of signing one's name or of writing a word or a phrase that has to be frequently used. There is a way of stamping small shapes in color which you will find most interesting, and you can work out many exercises in design by means of this little device.

A stick printing outfit containing a number of sticks of different shapes and some color pads can be bought from the school supply houses for a small sum; but there are various home-made substitutes for stick printing which will give good results. Of course, you must have some kind of liquid color dye with which to print. Colored inks are good, and very strong bluing will do for blue; but the most convenient way to get a variety of colors is to dissolve hard cakes of water color. With yellow, red and blue water colors in strong solution, you will be able to print in a variety of colors. Black ink will do for printing black shapes.

To prepare your colors, provide yourself first with three two-ounce bottles. In one, put a cake of yellow water color, broken up into pieces small enough to be dropped through the neck of the bottle. In another bottle, put a cake of red, and in the third a cake of blue.

Add to each bottle a teaspoonful of mucilage. Fill the bottles with water, put the corks in, and let them stand until the cakes are entirely dissolved.

For printing sticks, there are many things which you can use. The ends of matches will print small round or square shapes; the ends of small corks will print larger circular shapes, and the clean-cut edges of thick cardboard will print lines or stems. At the hardware store you can buy dowels, which are round sticks, in quarter-inch and half-inch sizes. Short lengths (about an inch) will make excellent printing sticks. With a knife you can whittle or cut the ends of these sticks into different shapes, and this will give you a greater variety of units of design.

For printing pads use small pieces of cotton flannel, folded double. Place a pad in a small saucer and pour on it a few drops of any of your dissolved colors. When the pad has soaked up the color, press the end of a printing stick into the pad, and then press it on white or light-colored paper. The impression should be clear and perfect. Practice printing these shapes with the other colors, and with the various sticks which you have collected.

To print green, pour a few drops of yellow and a drop or two of blue on the clean pad. The mixture will make green. To print orange, drop yellow and red on a clean pad. To print violet, drop red and blue on a clean pad. Experience will teach you how to add more or less of any color to produce the color you want (see the article COLOR). Fig. 11 shows many interesting shapes and groups of shapes that may be printed with this simple outfit.

When these units are carefully spaced in border rhythm, a number of interesting stripe designs will result. In planning stripe designs you will need to prepare a diagram by ruling your paper into equal spaces. Fig. 12 shows a piece of paper whose vertical edges have been ruled into equal spaces, and whose horizontal

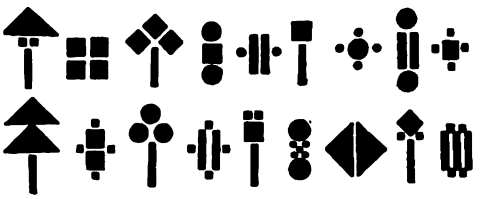


Fig. 11. Groups of shapes

spaces have been ruled into spaces one-half and one-quarter as large. In the spaces thus made, groups of shapes have been printed, as shown in Figs. 13 and 14. In Fig. 13 the background might be of light brown construction paper, and the shapes printed in red. In Fig. 14 the background might be light gray-green, and the shapes blue. With these pretty papers you can make boxes, envelopes, book covers or any other article that could be suitably made from decorated paper.

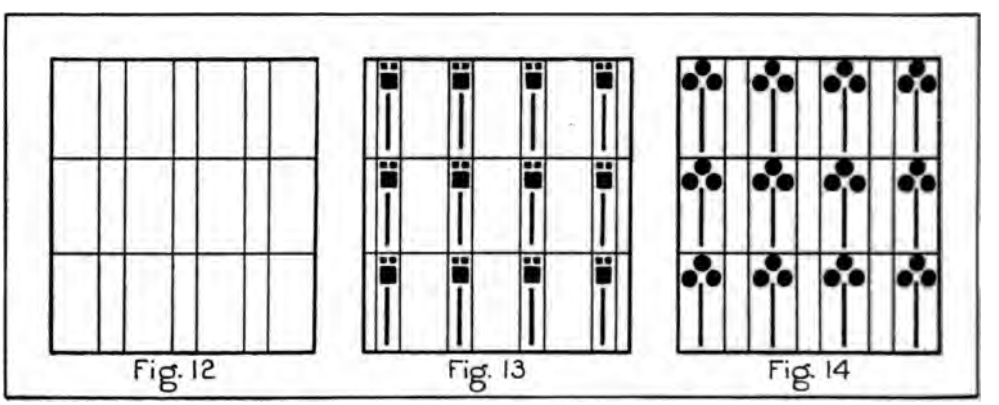


Fig. 12 Fig. 13 Fig. 14

Probably you would most enjoy printing these shapes on cloth, for then your designs would look like real patterns bought at the store. From your mother's piece-box select scraps and remnants of striped ginghams, calicos or percales. Blue and white, brown and white, green and white or black and white stripes will be excellent foundations for your designs. If the pieces are wrinkled, dampen them slightly and press them smooth with a hot iron. Fasten a piece to a board or stiff cardboard by pins placed on each corner. Then print a border rhythm made of repeated units or groups of units in alternate stripes. Figs. 15 and 16 show two good designs. Fig. 15 may be a dark blue, striped gingham, printed

blue and orange; Fig. 16, a green striped ngham, printed in red and black.

These printed fabrics may be made up into gs, as shown in Fig. 17. A twisted cord with veral bright beads strung upon it gives a

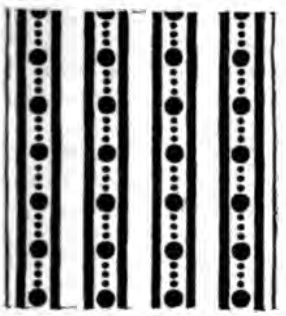


Fig. 15

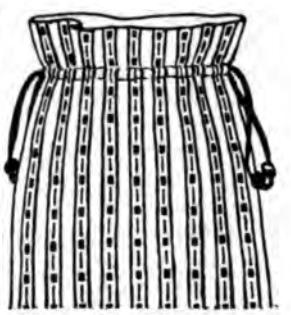


Fig. 17

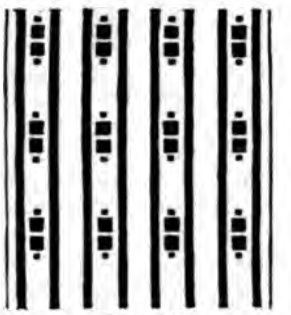


Fig. 16

ishing touch. Such a bag may hold a dus-r, or it may be used for a work bag.

Problem 3; Transforming a Biscuit Box. hen you print a number of stripes, side by de, on ruled paper or on cotton cloth, you tablish another kind of movement which rries the interest in another direction. Not ly does the eye move in the direction of a rder, but it travels over a surface, if it is tracted by interesting shapes and colors. esigns that are carried over a surface and at establish movement in two directions are lled surface rhythms. They are used in allpapers, textiles, carpets and rugs, for inlaid

In planning surface rhythms we again make use of a device that removes much of the difficulty of drawing and that saves much time. Squared black paper can be bought, or you can rule black construction paper into squares yourself, using a ruling-pen and the white, opaque water color known as "letterine," or white show-card color. The squares should measure about a quarter-inch on a side. With the black squared paper as a background, with white letterine and a No. 6 water-color brush, you can make many interesting surface rhythms. Fig. 18 shows a beginning; here a group of four squares has been filled in with white, and this unit has been repeated at regular intervals over the sheet. You can see that this makes a monotonous design. Our problem is to make it interesting. The background shapes need to be modified. In Fig. 19

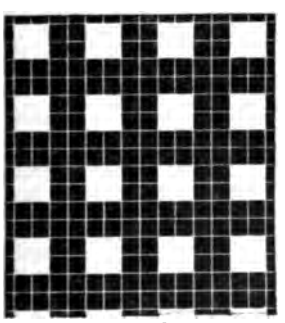


Fig. 18

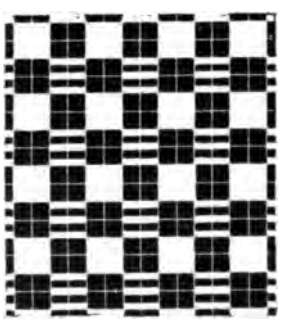


Fig. 19

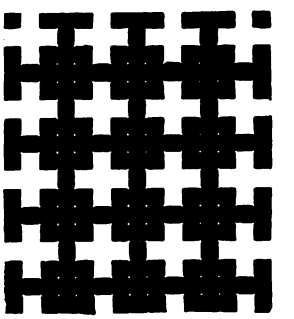


Fig. 20

ors and mosaics and for any other purpose here a decorated surface is desired. In all ch designs there should be the same rela-onships between repeated unit and back-ound that we found necessary with border ythms.

this has been accomplished by the addition of three horizontal bands in alternate squares. The design now has quality, and is worthy to be put to some practical use.

Bright color effects may be used with surface rhythms if we are careful to select color

harmonies (see COLOR, subhead *How to Use Color,* page 1483). Black and white can be depended upon to balance spots of intense color. A little of the strong color solution that you used for stick printing may be added to a small quantity of letterine, making the opaque color that we use in design. In mixing, pour a half teaspoonful of letterine into a small saucer and add to it the same amount of the strong color you intend to use. Mix it well with the brush, and spread the color evenly. You can paint light tones of opaque color on black or dark papers. This is not possible with transparent water colors.

Fig. 20 shows the beginning of a design that you will see has been used in a practical problem. A cross shape in bright blue opaque color was painted at regular intervals over a sheet of black squared paper. In Fig. 21 a white open square has been painted in each background space. This gives snap and brilliancy to the design, and it is now worthy to be used. Fig. 22 shows what this beautiful design did to an empty biscuit box. The wrappings and labels were all removed, disclosing a box of fine proportions and of a warm gray color. Panels of the decorated paper were cut for each side of the box, a half inch less in each dimension than the side for which they were planned. Paste was spread over the entire surface of the wrong side of these panels, and they were pasted on the four sides of the box so as to leave a half inch margin of gray all around the panels. The ends of the box were treated in the same way. A bright blue cord of mercerized cotton was twisted for a tie string, and to the ends of this cord were fastened an orange and a blue bead. These beads were a half-inch long, and were made of wood. They are the kind that children in the kindergarten use for stringing.

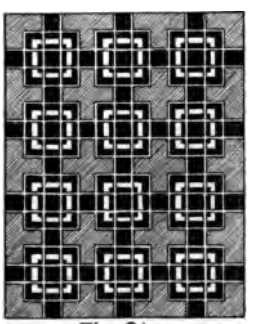


Fig. 21

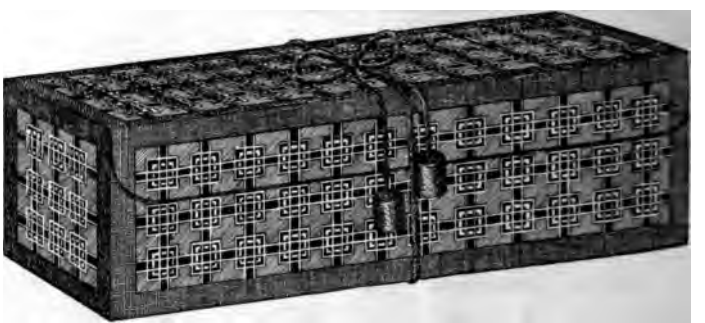


Fig. 22

When the box was finished, one would never believe, unless he had seen it, that a thing so attractive could have been made from such commonplace materials. Of what use is such a box? It can hold collections of Christmas candies, assorted nuts, sugared pop corn, tiny cakes or any of the numerous goodies that you can probably make yourself. But better than the contents is the experience to be gained in making the box and in learning that a knowledge and use of art can transform the humblest object into a thing of beauty.

Problem 4; A Decorated String Box. If you have watched the druggist and the grocer when they were weighing out the things they have to sell, you will know what scales are. They are instruments provided with weights placed at one end of a bar, which balance equal weights placed at the other end. Scales are sometimes called balances. You may not know that *balance* has anything to do with design; but we shall learn that balance is as important an art principle as is rhythm. Colors and shapes are forces which act on our eyes much as weights act upon a pair of scales. In a design, if one part pulls your attention one way, then there must be an equal force that pulls your attention in the opposite direction. When all parts of a design pull equally, it is said to be *balanced.* By using again the device of paper cutting, we can illustrate the simplest form of balance. Fold a small piece of paper in the middle. On the folded half draw a shape—any shape you like. (Fig. 23.) Be sure that the folded edge will be the middle of your design when the paper is unfolded. Cut out the shape you have drawn (Fig. 24) and open your paper (Fig. 25). You have now a balanced unit, one that is symmetrical, or exactly alike on both sides of its axis. Figs. 26 to 30 are other examples of symmetrical units that have been cut from

folded paper. You will find the device of paper cutting most helpful in working out these exercises in balance. Flower, leaf and fruit forms, animal shapes and shapes that

Fig. 23

Fig. 24

Fig. 25

Fig. 26

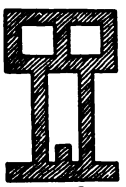


Fig. 27

Fig. 28

Fig. 29

Fig. 30

have no particular meaning can all be made into symmetrical designs through the medium of paper cutting.

The best way to learn about balance in design is to make something that will illustrate the principle. A box to hold a ball of twine is a useful article and will make a pretty gift. It can be decorated with balanced units

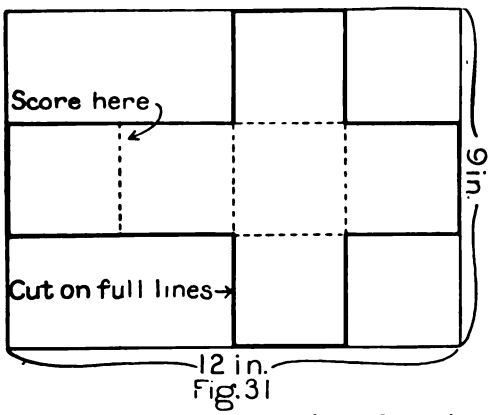


Fig. 31

painted with opaque water colors. On a piece of 9"x12" gray cardboard draw with a ruler the pattern shown in Fig. 31. Make each square in the pattern three inches on a side. Cut away the parts not included in the form of the cross, and score all the lines that represent edges to be folded. Fold on the scored lines, as shown in Fig. 32. Cut four pieces of dark gray paper each 3 inches by 1 inch. Fold these pieces on their long diameters. Paste each folded piece over a vertical corner of the box, as shown in Fig. 33. Cut other strips of dark gray paper, each 3 inches by one inch, fold them as before, and bind all other edges of your box. Now cut from folded paper a balanced unit large enough to make a decoration for the sides of the box. In Fig. 34 two shapes from the morning glory have been used, but you may choose any shapes that you prefer. Cut five 2½ inch squares of gray-green construction paper, fit your paper unit in each square, and trace around it. Prepare a circular unit for the top by cutting a circle and modifying it to suggest the top view of a flower. Trace this on the remaining square, and paste the squares on the sides and top of the box, slightly overlapping the edges of the

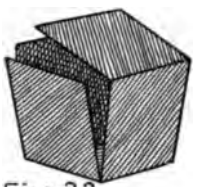


Fig. 32

Fig. 34

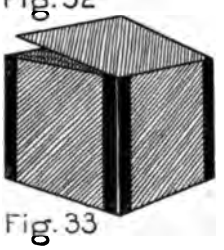


Fig. 33

Fig. 35

gray margins. With opaque water colors fill in the shapes. In Fig. 35 the lower part of the flower shapes on the sides may be painted white, and the upper parts light red. The circular shape on the cover is white, with a light red band on the outside. Keep the color scheme the same on all sides.

When the colors are dry, all the shapes should be outlined in India ink, using a small water color brush to carry the line. In the center of the cover an eyelet hole is punched, through which the end of the string is passed. Small slits are cut in the cover and near the top of one side, through which narrow gray tapes for tying the cover down are slipped. The ends of the tapes are pasted to the under side.

Problem 5; A Butterfly Flower Stick. We find the principle of balance illustrated in many forms of nature. The human figure itself is an example of symmetry. We have two eyes, two ears, two legs and two arms, balanced upon a central axis. Birds in flight are beautiful examples of perfect balance, for without wings that are stretched on each side of an axis, flight would be impossible. A butterfly suggests an exercise that well illustrates symmetrical balance, and which will result in an attractive decoration, to be used in connection with a bowl of cut flowers. A strawberry box is the basis of this bit of construction. On a 2"x3" piece of paper, draw the shape of a butterfly's wing. Cut out this shape (Fig. 36). From a berry box remove the strip that holds the top edges in place, and cut away one of the sections of thin wood from the side of the box. Rule a vertical line down the middle of this section. On each side of this line place the shape of the wing, using as a pattern the shape cut from paper (Fig. 37). With a pair of heavy shears cut out these wooden shapes separately. From a small pine stick about ¼" thick and 1½" long, whittle a shape that resembles the body of a butterfly (Fig. 38). Cut slits on each side of the back of this body for the insertion of wings, which also must be glued in place (Fig. 39). Short lengths of fine wire, curled

Fig. 36

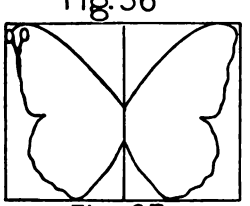


Fig. 37

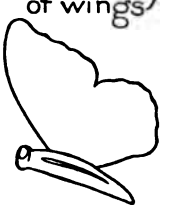


Fig. 39

at one end and stuck in the head, will suggest antennae, or feelers. Another longer length of wire is to be stuck through the body of the butterfly, as shown in Fig. 40. The other end of this wire is then fastened to a twig, or small stick (Fig. 40). Note the twist in the wire under the body that holds the butterfly in position.

The butterfly may be painted either with oil enamel paints or with opaque water colors. Show card colors are excellent for such work, but they are water colors, and if they are used,

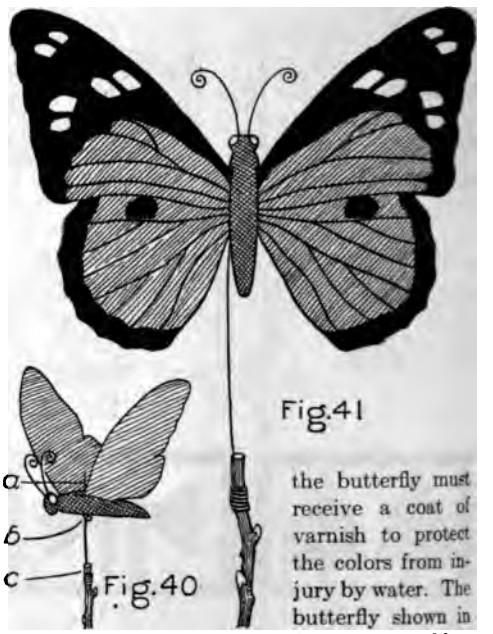


Fig. 40

Fig. 41

the butterfly must receive a coat of varnish to protect the colors from injury by water. The butterfly shown in Fig. 41 may be painted a dark, intense blue, with white and black markings. It may be used in a bowl of nasturtiums, its color forming a complementary harmony with the orange tones of the flowers (see color plate, in article COLOR).

Many beautiful color schemes may be arranged by combining these painted butterflies with the right selection of flowers. A yellow and black butterfly will look well with a bowl of pansies; a black and dark-green butterfly, with scarlet geraniums. The fine wire which attaches the butterfly to the stick causes the beautiful shape to vibrate, and apparently to hover over the flowers in a surprisingly lifelike way.

Problem 6; A Painted Match Box. If you are handy with tools, you can make many useful objects of wood and decorate them in obedience to the principles of design and color. Oil paints are best for wooden objects. You will need a cheap white paint for underlay, or filler, and enameled paints in white and colors for the finishing coats and the decorations. The color chart with the article COLOR will help you select beautiful color schemes for these articles.

To make the match box, you will need four pieces of ¼" white wood, cut in the dimen-

given in Fig. 42. This is a working ng, and gives you the facts you will need ow. The parts are nailed together with brads, and two holes are bored near the corners of the back, so the box may be ly hung. When the parts are nailed er, a coat of white underlay paint is d. When this is dry, the box is given a f white enamel. This is allowed to dry ghly. The box illustrated in Fig. 43 is ted with the balanced design given in 6. The balanced unit is painted orange,

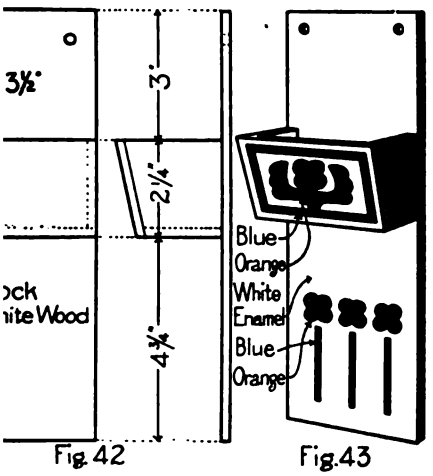


Fig. 42 Fig. 43

he marginal band is dark blue. The like forms on the lower part of the box ange, and the stems below them are blue. natch box of this kind is useful in a n, bedroom, bathroom, living room, or ver matches are necessary. A box can inted in any color scheme desired to the colors in a particular room.

blem 7; A Painted Box for Small Silver-

With your growing ability to design, o make objects of use and beauty, you ecome a desirable member of any family, ich articles as those just described are ed by rich and poor alike. The next m is even more interesting, for it de- a small wooden box or tray for holding s, and surely every family in the land has r such conveniences.

rter-inch white wood is the stock from the box is made. Fig. 44 is a working g, giving the dimensions of all the parts. oining of the parts is by means of the butt joint, and small brads are used to he parts together. The openings at the of the box add considerably to the dif-. These may be omitted if you like, though they make the box look a little more like a tray. When the box is finished, it is to be painted white, both inside and out, first with a coat of underlay and then with a coat

Fig. 45

of white enamel. When this last coat is dry, the box is ready to be decorated. Any border rhythm or balanced unit that you like may be used for the decoration. Fig. 45 shows three units that were cut from folded paper. Any of these units might have been used instead of the triangular shape that appears on the box in Fig. 46.

Your box may be lined throughout with velveteen or velvet paper, or you may simply line the bottom. The easiest way to do this is to cut a piece of cardboard a little smaller than the inside measurement of the box. Cover this with velvet paper or velveteen in a color that matches or harmonizes with the color of your decoration. The velvet paper or velveteen should be cut about an inch larger in each dimension than the cardboard, and should be mitred at the corners, brought smoothly over the edges of the cardboard, and pasted down flat to the underside. This covered cardboard should fit snugly into the box, and should be glued to the bottom. A piece of woolen cloth or felt should be cut a very

Fig. 44

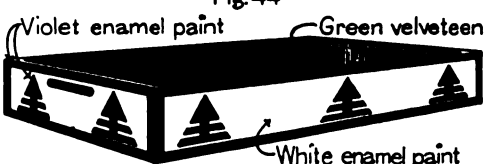


Fig. 46

little smaller than the outside measurement of the box, and should be glued to the bottom to protect the polished surface of the dining table, where the little tray will undoubtedly be used. Two tones of violet enamel paint may be used in painting the units and the marginal bands in Fig. 46. Green velveteen was used for the lining, which covers the entire inside of the box.

Problem 8; A Door Stop Made from a Painted Brick. In these days of improved habits of living, we have learned of the benefits of fresh air and sunshine. Whether we live in the city or in the country, open windows and doors are necessary to insure good ventilation. A banging door is an irritation to nerves. Door stops, or door porters, as they are sometimes called, fill a real need, in holding a door back against the wall or open at any angle desired. A door stop must be heavy in weight, not easily upset, simple in lines of construction, and decorative in appearance. A common brick answers all the purposes of use, and a pressed brick is still better. Its straight, sharp edges will not easily chip, and its smooth, hard surface readily takes paint.

A door stop such as shown in Fig. 47 illustrates both rhythm and balance. The elephant shapes used for the decoration of the top are balanced on each side of an axis. They are large and simple in shape, and they are decidedly "heavy" in suggestion. The design used on the sides is a border rhythm of simple units, so spaced as to create interesting background shapes. Another principle of design is illustrated by this object—the principle of harmony. Harmony is the agreement of all parts in a design, in expressing the complete idea. The doorstop is fitted for the use for which it is intended; it is attractive in shape and color; its decorations are well balanced and rhythmic, and it is a complete, unified and harmonious project. It may well be cited, then, as an example of three fundamental design principles—rhythm, balance and harmony.

The working out of this problem is as follows: The brick is first covered with a coat of white underlay as a filler. Then a coat of orange enamel paint is applied and allowed to dry thoroughly. The rhythmic decoration for the sides is then planned. A piece of paper 1"x 2" is folded on its long diameter (Fig. 48), and a simple "half shape" is traced upon the fold. The cut-out shape is shown in Fig. 49. This unit of design is spaced and traced on the sides and ends of the brick, to form the border rhythm in Fig. 47. For the decoration of the top, a piece of paper exactly the size of the largest face of the brick is cut and folded on the short diameter. A marginal line is drawn on all sides of this folded paper, about a quarter-inch from the edges. Within this space, the elephant shape is sketched (Fig. 50). This shape is cut from the folded paper, leaving the margins, and resulting in the balanced design in Fig. 51. The tracing of this design on the top face of the painted brick is an easy matter. The blanket shapes are next drawn. These are painted white,

Fig. 47

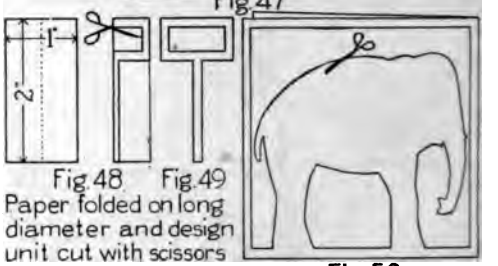


Fig. 48 Fig. 49

Paper folded on long diameter and design unit cut with scissors

Fig. 50

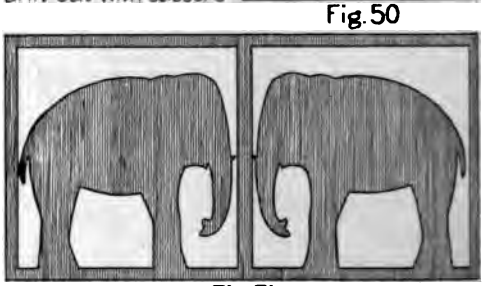


Fig. 51

leaving a border of orange, and the elephant shapes are painted black. White tusks and a white spot to suggest a sagacious eye are the finishing touches. The marginal bands which reach the edge of the brick are painted black. In the border rhythm the use of black and white enamel paints is plainly shown in Fig. 47.

Problem 9; The Possibilities of Olive Bottles. You will begin to think that art can transform any worthless thing into something useful and attractive. This is not wholly true, for some objects are made in proportions that are not esthetic, although these proportions may be necessary or best for the use or function of the object, and therefore are in a sense beautiful. The ordinary Mason fruit jar used for home canning is a case in point. No amount of decoration could change the commonplace proportions of this jar nor make it a suitable receptacle for flowers, nor give it the right to be called a "vahse;" but with olive bottles the case is different, for there we see refinement of proportion and contours

that are graceful. When we are sure of fine proportions and good outlines as a basis, we can with propriety begin to think about adding decorative elements in shapes and colors.

Proportions are wonderfully important in design. The beauty of a Greek vase is almost wholly a matter of proportion. We speak of a man or a woman as having a finely-proportioned figure. This means that such a person is neither too short nor too tall, too thin nor too stout. Even a sheet of paper for a letter or a book page is planned to be in suitable proportions, both for use and for the "looks of it," which means the consideration of beauty. Designs which are planned with regard to the proportions of an object, and which take into consideration the line of construction on which the object is built, are called *structural designs*. We shall develop structural designs in the next two problems.

These decorated olive bottles make most satisfactory flower holders, especially when the colors are planned in relation to certain flowers that complete the color schemes and produce a wonderful harmony. Fig. 52 illustrates a bottle planned to hold the gorgeous African

marigold. It might also be used with brown-eyed Susans, with goldenrod or with yellow chrysanthemums. Its decoration is simply a matter of structural proportion. The bottle is about ten inches high; more than half of it is painted a brilliant orange, with enamel paints. More than half of the remaining height is painted intense yellow, and the rest of the bottle a fine yellow-green (see *How to Use Color Knowledge*, page 1484). When these colors are dry, bands of black enamel paint are added where the colors meet, and at the top. When this is dry, the whole bottle is given a coat of white copal varnish. The result is a striking color combination, and when a few long stemmed marigolds with their green leaves and gorgeous blossoms are placed in the bottle, the effect is startling in its brilliant beauty.

Fig. 53 shows another ten-inch bottle painted as a receptacle for scarlet sage, or salvia. The lower part is painted a fine green, the neck, white; and the "collar," scarlet, all with enamel paints. When these colors are dry, the white stripes are added. They are about a quarter-inch wide and are painted freehand, with a No. 3 water color brush.

The bottle shown in Fig. 54 was planned to hold the sweet, old-fashioned flower, mourning bride—*sweet scabious*, the botanists call it. This is a shorter bottle than Figs. 52 and 53, being only seven and one-half inches high. The lower part is painted medium violet, made by mixing cardinal red, ultramarine blue and white enamel paint; the neck, a yellowish pink, made by mixing vermilion and white enamel paints. The collar repeats the violet note of the lower part. When these preliminary coats are dry, rhythms of white triangular shapes are painted in a vertical direction on the violet background. There are six of these rhythms around the bottle, painted freehand. A separating band of white is also painted where the violet coat meets the light vermilion on the neck. In this bottle pink, white and violet asters also look extremely well.

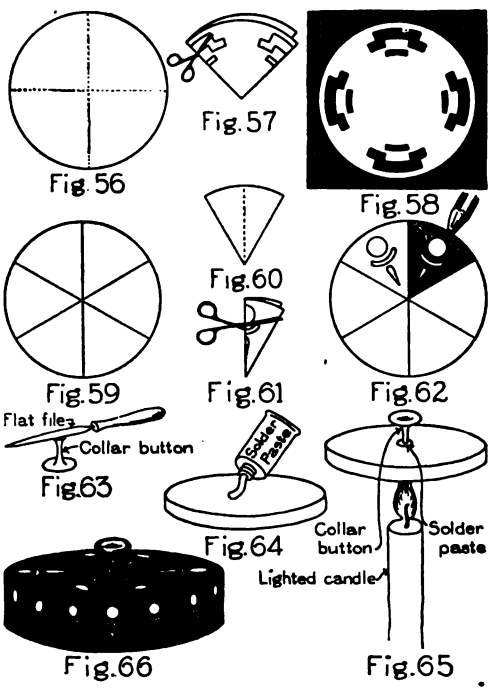
Fig. 55 shows another interesting decoration. Here the bottle is eight and three-quarters inches high and two and one-half inches wide. The entire bottle is painted black. When this coat is dry a design of white squares is painted near the top. The simplicity of this black and white scheme heightens the effect of fine yellow dahlias placed in the bottle.

There is no end to the color effects and the color combinations that can be secured by using these painted bottles in connection with our best-known garden flowers. It does not take an artist to secure these interesting results, but it does take understanding of the principles of design and knowledge of color. Such information is within the reach of all.

Problem 10; Redeeming a Marshmallow Box. Not every tin container is fine in proportion, but many boxes in which tea, preserved fruits and candies are packed are of good proportions

and shapes, and are worthy to be decoratively painted in bright colors. There are many uses for such boxes. The circular marshmallow box, made of tin, is especially well adapted to the development of our last problem in this series.

In carrying out the idea of structural design it will be necessary for us to plan a design for a circular space. There are various ways of doing this. Let us again resort to the device of paper cutting. First, draw with compasses a circle about four inches in diameter; this is probably a little smaller than the top



of the box. Fold it on a vertical and a horizontal diameter (Fig. 56). Upon the folded quadrant sketch a simple shape or two half shapes, as shown in Fig. 57. Cut out the shape or shapes, and the result will be something like Fig. 58. Such a design is structural, because it is based on the lines of the construction of the form which encloses it

Another method of planning a design for a circular shape is shown in Figs. 59 to 62. Here two four-inch circles are drawn; by setting off the length of the radius each circumference is divided into six equal parts. Three diameters are ruled on each circle, connecting the opposite points of division on the circumferences. A segment is then cut from one of the circles (Fig. 60) and folded on its axis (Fig. 61). A half shape is drawn upon the folded segment, and cut out. The result is a balanced unit of design. This unit is placed on each of the segments of the circle which remains uncut. The repetition about a center which is seen in this design is known as *radiation*, because the different parts of the design seem to radiate from a common center like the spokes of a wheel or the petals of a daisy. Radiation is sometimes mentioned as a principle of design.

Before the circular design is placed upon the top of the marshmallow box, there is another interesting operation to perform. Our gift box should be provided with a handle. A discarded brass collar button exactly suits our purpose. The center of the upper side of the cover must be scraped with a knife to make it rough. The small end of the collar button must be filed for the same purpose (Fig. 63). There is a certain kind of solder called *solder paste* which must now be used, for ordinary solder will not answer. Solder paste is put up in tubes, like library paste or dental cream, and can be squeezed in small quantities from the tube. Apply a little of this solder paste to the center of the cover, also to the small end of the collar button. Place the small end of the collar button exactly in the center of the upper surface of the cover, and hold it in place over a lighted candle or match, as shown in Fig. 65. As soon as the paste bubbles from the heat, fusion of the metals has taken place, and the flame may be extinguished.

Your box may now be painted black, dark blue or green, with enamel paints or japalac. This coat must dry over night. Then the design which you cut from the circular piece of paper may be fitted on the top and traced. A simple border rhythm must be planned for the sides. This is best done by cutting a strip of paper as wide as the height of the box and long enough to reach around it. In Fig. 66 the unit cut for the top (Fig. 62) was spaced for the decoration of the sides. The border rhythm should be spaced and drawn on the strip of paper, and each unit cut out. The strip thus becomes a stencil, by means of which the decoration can be placed on the sides of the box. The color scheme of the box illustrated in Fig. 66 may be dark blue, white and orange. Any design and any harmonious color scheme can be used.

In carrying out the problems which require the use of enamel paints, you will need black, white, yellow, ultramarine blue, light green,

ıal red and vermilion. There are numer-
nakes of good enamel paints in the mar-

B.S.

)USTRIAL EDUCATION. See TECHNI-
ND INDUSTRIAL EDUCATION.

)USTRIAL SCHOOL. Institutions in
ı the industrial arts are taught are loosely
ed together under this name, but the
is gradually being replaced by others
exact in meaning. Public institutions in
ı young and neglected children, or boys
girls who need corrective influences, are
t useful occupations for the purpose of
oping mind and character, belong to this
; they are known specifically as reforma-
, or reform schools (which see). Voca-
l training of a more advanced character
ren in the public schools of the larger
ı and cities, and the various trades are
t in institutions known as trade schools.
'OCATIONAL TRAINING; MANUAL TRAINING.
nique system of industrial education has
developed in connection with the schools
ary, Ind., whereby the children of the
workers are taught to be workers them-
ı. For description of this plan, see GARY
)L SYSTEM.

)USTRIES, *in'dus triz.* The earth is the
e of all wealth, but much of the material
ı constitutes wealth needs to be changed
e it is useful to man. The discovery of
)est methods of applying the forces of
e to the transformation of raw material
ıseful products has been one of the great-
roblems confronting the race in all ages.
to the extent that man has succeeded in
olution of this problem has civilization
ıced. Attempts at this solution have led
.e invention of the steam engine, the
ing frame and power loom, the cotton
he steamboat, the locomotive, the reap-
ıachine and many other appliances, and
e discovery of the many chemical proc-
now in common use in the industrial

: evolution of industries marks the prog-
)f civilization. At first each man made
mself the articles he needed. Then came
xchange of articles on a simple scale.
ıan made shoes and another raised wheat,
t was found to be to the advantage of
to exchange products, so the farmer gave
hoemaker wheat for shoes. From this
: method of exchange the great industries
e world have been developed to their
ıt proportions. A good example of this development is seen in the boot-and-shoe industry, which is one of the most highly organized industries in the world. See BOOTS AND SHOES.

Related Subjects. The WORLD BOOK has given the subject of industries ample treatment; the reader will find the following articles interesting and instructive. Many of the topics here referred to also have lists of related subjects, and the course of reading indicated is thus wide:

Agriculture	Forests and Forestry
Blasting	Foundry
Bleaching	Hat
Boots and Shoes	Linen
Brewing	Lumber
Brick and Brick-Laying	Meat and Meat Packing
Calico and Calico Printing	Mining
Carpentry	Plumbing
Commerce	Printing
Cotton	Quarry and Quarrying
Creamery	Rolling Mill
Dairying	Rubber and Rubber Manufacture
Dredging	Silk
Dyeing and Dyestuffs	Spinning
Factory and Factory System	Tanning
Fish	Weaving
	Wool

INERTIA, *in ur'shi a.* A favorite trick among boys is to place a coin on a card, balance the device on the end of the forefinger and snap the card out, leaving the coin on the finger. Tie a small cord to a hammer or a sad iron and jerk the hand up quickly. The cord will break, but if you pull steadily the weight will be lifted. Try to turn a sharp corner and remain exactly upright when you are running rapidly. What happens? All these experiments illustrate *inertia,* which is a property of matter which prevents a body from setting itself in motion, or when in motion, from stopping itself. Stated scientifically, the law of inertia is as follows:

> A body at rest remains at rest, and a body in motion moves in a uniformly straight course unless acted upon by some exterior force.

Because of inertia some outside force must be supplied to produce or to arrest motion; the heavier the body the greater the force required. It requires just as much force to stop a body in motion as is required to produce the motion. For example, it requires as much force to stop a railway train running forty miles an hour as was used in giving the train its speed. Serious accidents occur to automobiles and on railways because the moving bodies cannot be instantly stopped and so prevent collisions.

INFANTILE PARALYSIS, *in'fan tile pa ral'i sis,* a disease to which children are espe-

cially susceptible, and which sometimes attacks adults. Its scientific name is *anterior poliomyelitis*. It is much dreaded because it is attended by paralysis of the muscles, due to the fact that the poison introduced into the system infects the spinal column. It is essentially a summer disease. The infection is caused by a special microbe, the nature of which is not fully understood. At various times after the disease was first recognized, in 1840, epidemics appeared both in Europe and America, an especially severe one occurring in the summer of 1916 in New York; and other American cities caused health authorities and physicians to exhaust every possible means of preventing and curing the infection. The death rate in New York City was about twenty-two per cent.

The disease does not spread in the same manner as does smallpox or diphtheria, but is transmitted by the most roundabout routes. Ten or twelve cases may appear in one neighborhood, and another group be in a different neighborhood, from one to three or four miles away. Often there will be but one case in a single family or apartment building. In other words, the control of the disease has been made especially difficult because it is as yet impossible to trace the source of any single case. It has been aptly described as a "pestilence that walketh in darkness." At the same time health authorities unite in urging parents of young children to take stringent precautions against it (see subhead below, *Preventive Measures*). It is thought by some that the disease is spread by persons having so mild an attack that the symptoms are not recognized.

Symptoms. Early symptoms are fever (not usually higher than 103°), vomiting, bowel disturbances and headache. Accompanying these there may be symptoms associated with other diseases, such as sore throat and infected tonsils, discharges from nose and eyes, and a distressing cough. Specially characteristic of infantile paralysis, however, are the pains that occur in the legs and feet, stiffness of the neck and sensitiveness of the spine. Complete paralysis of the limbs is liable to result within twelve hours. Following this there may be delirium and convulsions. Diagnosis of the disease is difficult whenever the resulting paralysis is slight or transient, and to overcome this difficulty physicians test the muscles by a specially-devised apparatus.

Treatment. The injection into the spinal column of blood serum taken from a person cured of the disease has been found to be the most helpful single remedy. The treatment of infantile paralysis is still in the experimental stage, and much advancement in this particular field is expected within the next few years. Doctors advise the most careful nursing, including the application of heat to paralyzed limbs. Cases that recover sometimes require months of persistent effort to prevent permanent weakness of the limbs. In some instances the paralyzed limbs are too tender to be touched for some time after the beginning of the attack, but massage may be commenced within two weeks in mild cases. Manipulation and massage or electrical treatments, directed by a reliable physician, are considered absolutely essential, and they must be kept up as long as there is evidence of weakness. Otherwise the muscles will shrink and the child become permanently lame. Surgical appliances, such as braces or splints, are often resorted to to prevent lameness or deformities.

Preventive Measures. When any community is subjected to the peril of infantile paralysis, all of the children should be protected in every possible way. They should be kept scrupulously clean and their diet should be watched carefully. Raw fruit and vegetables that are unripe or over-ripe, or that have been exposed to flies or dirt, must not be eaten, and the mother must restrain the child in his fondness for candy, soda water, ice cream and ice water. Do not patronize street vendors of fruits and vegetables, or food merchants who do not keep their premises in a strictly sanitary condition, is one warning of the physician. Flies, neglected garbage and sick animals about the house must not be tolerated. It is also wise to keep the children out of all crowded places. Health authorities insist on strict quarantine rules, all victims of the disease being isolated in their homes or in hospitals. Persons known to have been exposed to the disease are also placed in quarantine. W.A.E.

INFANT MORTALITY, *mawr tal'i ti.* The subject of the death rate among young children, who constitute the material that goes into the making of the citizen body, is a matter of vital interest to the state. Investigations show that about one-fifth of all the people who die in a specified period are infants under one year of age, and that almost one-fourth of the total deaths are of children two years old or less. While statistics vary for different countries, it has been established that young babies

everywhere die at an alarming rate. The investigation of the causes of this condition and efforts to find a remedy for it are occupying the attention of government bureaus, infant welfare societies, visiting nurse associations and similar organizations in nearly all civilized countries. As a result, the death rate for babies is slowly but steadily falling.

Causes. A large percentage of babies that die are born in the homes of the very poor, where poverty and ignorance are leagued against the little unfortunates from the start. Social workers in the tenement districts have found mothers who were accustomed to feed their young babies everything from beer to solid foods. Aside from improper feeding, observation proves that overcrowding, dirt, lack of ventilation, lack of sanitation and especially the prevalence of flies are common causes of diseases that carry off young babies by the thousands. Diarrhoea and other intestinal troubles, occurring mostly during the hot season, head the list of special infant diseases, and bronchitis and pneumonia follow.

Another important cause of infant mortality is heredity; the offspring of alcoholic or diseased parents, for instance, come into the world lacking in vigor, and hence are especially susceptible to the various diseases that attack infants. Statistics show also that bottle-fed babies die in greater numbers than those fed at the breast. This is due largely to the fact that it is often difficult to find the artificially-prepared food that is best suited to the child in question.

The Remedy. Education, the great enlightener, is responsible for much that has been accomplished in lowering the infant death rate. Health officers and visiting nurses are sent out by boards of health and various infant welfare societies to instruct mothers how to care for their babies, and the nurses give active assistance in the homes they visit. Some cities maintain stations for dispensing pasteurized milk (see MILK) free or at small cost to poor families. Diphtheria antitoxin, now supplied free to those unable to pay for it, has greatly lowered the death rate from diphtheria. Improved sanitary conditions, more careful inspection and supervision on the part of health authorities, and the merciful work of fresh air and other aid societies, have all served to diminish the number of deaths among the babies.

The reader who wishes to study the subject in more detail can profitably consult G. B. Phelps' *Statistical Study of Infant Mortality;* G. B. Mangold's *Child Problems; Annual Reports* of American Association for Study and Prevention of Infant Mortality (Baltimore, Md.); *Mortality Statistics* issued by the United States Bureau of the Census. S.C.B.

INFANTRY, *in'fan tri,* the most important branch of an army, consisting of men who march and fight on foot and are armed with hand weapons. The armies of the ancient Greeks were composed of infantry, and when in the formation known historically as the phalanx they proved everywhere invincible. The phalanx was eight to sixteen ranks in depth, either forming a triangular wedge or a solid square arranged in subdivisions, each consisting of a company of 120 men. The phalanx was also adopted by the Romans, who undoubtedly produced the finest infantry the world has ever seen. Mounted troops or cavalry played a very subordinate part in old Roman warfare. In the Middle Ages and the days of chivalry horsemen had come to be regarded as the only real fighting men, and foot soldiers were regarded as a mere mob.

The great battles of Crécy (1341), Poitiers (1356) and Agincourt (1415) were, however, won by English infantry, or archers, fighting in conjunction with mounted men who had previously regarded all foot soldiers as almost useless. Infantrymen were afterwards esteemed not only as good fighting men, but as the most essential part of an army. The weapons of the Romans and Greeks were adapted to close-quarter fighting, but the perfection of the bow and the introduction of the crossbow or arbalest necessitated great alterations in tactics. English archers became so expert that from a distance they could pour into the enemy's ranks a galling fire of arrows which prepared the way for cavalry charges.

The introduction of modern artillery again made necessary many changes in tactics and formation. The solid mass of men who might withstand the fire of bows and arrows could be swept off the earth by the fire of artillery, projectiles from which would plow through rank after rank. Gunpowder made all troops equal. The mailed knight found no protection in his armor, so he discarded it.

Modern infantry has been developed on lines demanding the abolition of close formation and the adoption of tactics embodying open formation or "extended order," with intervals between men to render the enemy's fire less effective than if directed against a mass. In

the United States this open formation adopted in the War of Secession (1861-1865) was the result of instinctive self-preservation and common sense of the soldiers themselves. In the Boer War (1899-1902) the British losses in the first engagements were serious on account of the close formation adhered to; the losses greatly diminished as soon as the open order formation was adopted.

In the beginning of the European War (1914) the German troops still adhered to close formation, their losses being consequently heavy. Time was probably an important factor in this; the German plan of campaign involved reaching Paris at once. Only by delivering a crushing blow to the allied forces of France and Great Britain quickly could Germany hope to set free its armies to face the Russian invasion on the East. With more time at their disposal doubtless the formation would have been different and the loss of life less. The only alternative was by weight of numbers to make up for lack of time. So the German forces in huge numbers were hurled against the allies, who would thus be compelled to take close order to resist such weight of attack and consequently also lose heavily. The actual fighting of the mounted troops still must remain secondary in importance to the infantry, who are to be relied on to deliver the decisive attack. See ARMY.

INFIN'ITIVE. In the sentence, "He travels constantly," the verb *travels* expresses definite action on the part of its subject, *he;* and to agree with that subject it is limited to the form for the third person singular. In the sentence, "He loves to travel," the finite verb which does the asserting is *loves;* the verb-form *to travel* is really used as a noun, the object of *loves,* and merely names the action of traveling, assuming the action instead of affirming it. This is called the *infinitive* use of the verb. Usually the infinitive is preceded by *to,* called the *sign of the infinitive.*

Being unlimited, the infinitive has the same form at all times, no matter what may be the person and number of its subject. It may be either active or passive, but it has only two tenses—present and perfect: *to see, to be seen,* expressing present tense, active and passive voice respectively; *to have seen, to have been seen,* expressing perfect tense, active and passive voice. Infinitives are so much like verbs that they may take objects, complements or modifying adverbs, and yet they may also serve in the capacity of noun, adjective or adverb. In this respect they are like the participles, and both infinitives and participles are often grouped under the general name of *verbals.*

As to the Split Infinitive. To insert any word or words between the verb and its sign is to "split the infinitive." It was formerly considered a grave offense to do this under any circumstances, and it is still to be avoided as a general thing, because the indiscriminate splitting of infinitives marks the careless or ignorant speaker. However, the opinion seems to be gaining ground among modern grammarians that it is occasionally permissible to place an adverb in this position provided it is necessary to do so in order to bring out the precise meaning. It makes the sentence clearer to say, for instance, "*To really understand* the situation you will have to go there in person," than it would be if we said "*Really to understand* the situation," or "*To understand* the situation *really.*" In such a sentence as, "He was understood *to more than hint* at the possibility of trouble," the splitting of the infinitive is practically unavoidable unless the sentence is recast in other words.

In the majority of cases, however, it is neither necessary nor forceful to split the infinitive in order that the adverb may come closer to its verb. "He promised *to thoroughly do* the work," for example, is not nearly so good a construction as "He promised *to do* the work *thoroughly.*"

Common Errors. The use of one tense where the other is required, and the splitting of the infinitive without good reason, are the principal sources of error in connection with the infinitive.

I should be greatly pleased to have gone, for *I should have been greatly pleased to go.* The act of going refers to a later time than the pleasure, and time subsequent to that of the principal verb requires the present infinitive.

It was our duty to have written, for *It was our duty to write.* Here the same time is denoted: *It was our duty* (then) *to write* (then). Coincident time also calls for the present infinitive.

Rome is supposed to be founded by Romulus, for *Rome is supposed to have been founded by Romulus.* Since the mythical founding is a matter of the far-away past, while the supposing is present time, the infinitive must take the perfect form.

I am going to go West next year, for *I am going West next year.* The infinitive is redundant.

You will please not to say anything about the matter, for *You will please not say anything about the matter.* After *please* the sign of the infinitive is dropped.

He bade her to enter, for *He bade her enter.* When *bid* is used actively and positively, to is

omitted. When the verb is negative or passive, the sign is retained; as *He bade her not to enter; She was bidden not to enter.*

Try and come early, for *Try to come early.* The meaning intended is not *try,* but *try to come,* as is made plain if we reverse the two verbs: *Come early and try.* This is a very common error with those who forget that *try, endeavor,* and equivalent expressions like *make an effort,* need the infinitive to complete their meaning, and not another finite verb connected by *and.*

The child was told to not stir from the spot, for *The child was told not to stir from the spot.* Here the splitting of the infinitive serves no useful purpose and only indicates ignorance of the rules of grammar or carelessness in applying them.

INFLECTION, *in flek'shun.* There is an expressive figure of speech wrapped up in the word *inflection,* for it comes directly from a Latin word meaning *bending.* Inflection is a modification or change in the form of a word by which it is bent to some use or meaning not possessed by its simple, or uninflected, form. In the sentence, "She will go sailing in her uncle's yacht," the words *will go, sailing, her* and *uncle's* are all inflected forms, being variations of *go, sail, she* and *uncle.* Only five of the eight parts of speech are subject to inflection—nouns, pronouns, verbs, adjectives and adverbs.

Inflection is accomplished in three different ways: First, by a change in the ending, as in the case of *sailing* and *uncle's* in the sentence quoted; second, by the use of an auxiliary, as in the case of *will go;* third, by the use of an entirely different word, as in the case of *her.* The inflection of a noun or a pronoun is called its *declension.* Nouns are inflected for number, gender and case, and pronouns for these and for person as well. The inflection of adjectives and adverbs is called *comparison,* and that of a verb its *conjugation.*

Related Subjects. These various inflections are explained fully in the following articles in these volumes:

Case	Gender
Comparison	Number
Conjugation	Person
Declension	

INFLORESCENCE, *in flohr es'ens,* from a Latin word meaning *to blossom,* is the name given in botany to the arrangement of the blooms on the flower-bearing part of the stem, and first applied by Linnaeus, the Swedish botanist. There are two principal types of inflorescence, described as *racemose* (*ras'e mohs*) and *cymose* (*si'mose*). In the former, flowers are borne on tiny branchlets arising from the main stem; and in the latter on small branches of the stem which are longer and more strongly developed than the central stalk. See FLOWERS.

INFLUENZA, *in floo en'za,* or **GRIPPE,** *grip,* an infectious disease which swept over the United States late in the nineteenth century. Since that time acute colds of every sort have been called, loosely, grippe. The real influenza is due to a minute bacillus. It is very similar to, but more severe than, an ordinary cold. The symptoms of a typical attack are headache, chills, fever, and an aching feeling in the joints of the body. If properly treated the patient usually recovers in a week or ten days, but influenza often leaves its victim in such a weakened condition that bronchitis, pneumonia and similar ailments may develop if he is not carefully guarded until his strength returns.

An attack of grippe can usually be conquered at the beginning by means of certain decisive measures and remedies. These include the administration of laxatives to insure free bowel action, hot mustard foot baths to induce perspiration, hot drinks, such as lemonade, and a dose of quinine. Above all the patient must have absolute rest in bed. If the attack is somewhat severe it is well to have a physician take charge of the case. A developing case can often be cut short by the victim's going to bed, taking a purgative and drinking water freely.

When a community is invaded by an epidemic of influenza the well can help to avoid the disease by keeping away as much as possible from crowded halls and public conveyances. The use of antiseptic sprays for the mouth, throat and nose is often an effective preventive measure, and it is also advisable to take especially good care of one's general health. W.A.E.

INFUSORIA, *in fu so'ri a,* the highest division of one-celled animals (see PROTOZOA). Originally the name was applied to all the microscopic animals which were discovered in *infusions* of vegetable matter, but scientists now restrict the term to those protozoans which possess, near the mouth opening, one or more hairlike appendages, called *cilia,* that aid them in capturing their food. All infusoria are water animals, and they breed most rapidly in stagnant water exposed to the sunlight. See VORTICELLA.

INGALLS, *ing'galz,* JOHN JAMES (1833-1900), an American lawyer, orator and states-

man, for eighteen years a United States Senator, was born at Middleton, Mass. He was graduated from Williams College in 1855, and in 1858 removed to Atchison, Kan., where he practiced law and became interested in the antislavery movement which was then centering there. For many years he was editor of the Atchison *Champion*. In 1873 he was elected United States Senator from Kansas and reëlected in 1879 and in 1885. Ingalls was noted for scholarly attainments, was a brilliant writer and eloquent speaker and excelled in the power of descriptive writing. He attracted attention in his later years by his literary talent; his best-known poem, *Opportunity*, printed below, is destined to live:

Master of human destinies am I!
Fame, love and fortune on my footsteps wait;
Cities and fields I walk; I penetrate
Deserts and seas remote, and passing by
Hovel and mart and palace—soon or late
I knock unbidden once at every gate!

If sleeping, wake; if feasting, rise before
I turn away. It is the hour of fate,
And they who follow me reach every state
Mortals desire, and conquer every foe
Save death; and those who doubt and hesitate,
Condemned to failure, penury and woe,
Seek me in vain and uselessly implore.
I answer not, and I return no more!

INGELOW, *in'je lo,* JEAN (1820-1897), an English poet and novelist, born in Lincolnshire. Her fame was established in 1863 by the publication of her *Poems*. This collection passed through twenty-three editions and contained, among other poems, *High Tide on the Coast of Lincolnshire* and *Divided*. Later publications included *Songs of Seven, Poems of the Old Days and the New,* and the novels, *Off the Skelligs, Sarah de Berenger, Don John,* etc. Jean Ingelow excels in descriptive lyrics, although her novels possess much of the charm of her poetical writings.

INGERSOLL, a town in Oxford County, Ontario, in the southern part of the Ontario peninsula. It is on the Grand Trunk and Canadian Pacific railways, nineteen miles northeast of London, thirty-six miles west of Brantford and sixty-one miles southwest of Hamilton. It is also connected with Woodstock, nine miles northeast, by electric railway. Though not a large town, Ingersoll has extensive manufacturing interests, and ships large quantities of machinery, agricultural implements, furniture, woolen goods, flour, packed meat products, pianos and hearses. After the outbreak of the War of the Nations the manufacture of shells became one of the leading industries. Population in 1911, 4,763; in 1916, about 5,500.

INGERSOLL, *ing'ger sol,* ROBERT GREEN (1833-1899), an American lawyer, lecturer, orator and writer, who became widely known throughout America as a pronounced opponent of orthodox Christianity. For his subject matter he drew largely on the works of Thomas Paine (which see). Ingersoll was born in Dresden, N. Y., the son of a Congregational clergyman. After the removal of the family to Illinois, Robert took up the study of law, was admitted to the bar and later entered politics as a Democrat. In 1862 he took part in the War of Secession, serving as colonel of the Eleventh Illinois Infantry. After the war he became prominent in Republican politics, securing national fame in 1876 by reason of a stirring speech delivered in behalf of James G. Blaine at the Republican Presidential convention at Cincinnati. He was also notably successful as a lawyer for several large corporations. His published works include *The Gods, and Other Lectures, Some Mistakes of Moses* and *Great Speeches*.

INHERITANCE TAX, an assessment levied by law upon property descending by will to heirs or other beneficiaries. For over two thousand years this has been one of the important sources of government revenue, the original levy having been made in Rome before the Christian Era. Governments of Europe upon their organization during the centuries have in nearly every instance adopted the plan, with modifications and improvements upon the Roman method. Inheritance taxes in England and Germany have provided for many years a very large revenue, and in those countries to-day are called "death duties." Canada does not impose such a tax in behalf of the Dominion, but the provinces are permitted to make it a part of their source of revenue. In the United States during the War of Secession Congress passed an inheritance tax, but it was repealed with the restoration of peace. Several states have such a law in operation, notably those along the Atlantic seaboard. The revenues of New York are largely increased by a state law taxing inheritances, because of the many large fortunes held there.

An inheritance tax is approved by practically all economists, but has been fought by wealth, particularly in the United States, on the ground that it is a direct tax, therefore illegal, because according to the Constitution direct taxes must

vied among all the people. The courts declared that such a tax is equally im- upon all classes, and that it is neither ct tax nor a property tax, as those terms gally viewed. Usually the law exempts inheritances from taxation, although in states all estates above $1,000 come n its operation. The rate is graduated— w as one per cent where the estate is , increasing to five per cent of large for-

A.E.R.

TIATIVE, *in ish' i a tiv,* AND REFER-DUM, *ref er en' dum,* political measures de- d to give the entire body of people of a or city what amounts to control of all rtant legislation; wherever they are in legislative bodies are deprived of inde- nt action in lawmaking. To *initiate* is rform the first act, or to set on foot; the *tive,* then, is the power of commencing taking the first steps in the making of

Referendum is derived from *refer,* and s *to bear* or *carry back;* the word, then, s to laws duly passed by legislative bodies n are referred back to the people for val before they can become effective. tive and referendum principles as usually en into the statutes do not entirely take place of the lawmaking body, but rather a steadying hand over legislation. Taken the newer political principle, the recall h see), the three represent the most ad- d theories of self-government in the di- n of restoring power to the people which efore has been wholly delegated to their sentatives.

e initiative is a comparatively recent de- ment, but the referendum has been em- d with success under varying political tions for years. Since 1874 it has been a of Switzerland's basic law, and in that try popular control of legislation has ed its highest perfection. In two Swiss ns the referendum has been in force since ixteenth century.

stralia and New Zealand, by adopting the iples of the initiative and referendum in at the time of confederation, gave evi- e of advanced political thought. In the government of Great Britain these meas- have not yet taken root, although the iples of referendum and recall have been iced there for many years, particularly respect to the resignation of the ministry appeal to the country when a vote show- ack of confidence is taken in Parliament.

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While the initiative and referendum have been discussed in Canada no steps have yet been taken to enact these principles into laws.

The Referendum. In the United States, since the organization of the government the referendum has been operative to a limited extent on important questions, but not known by such name in those matters to which it has been applied. Amendments to the Federal Constitution, when passed by Congress, must be sent to the states for approval through their legislatures; state constitutions in nearly every instance after being formulated in the usual constitutional conventions have received the approval of a majority of the voters of the new state. Questions involving bond issues and other expenditures of large sums of money are first subjects of legislative action, but must have final approval of a majority of the voters within the jurisdiction affected. These are really instances of referendum votes.

The adoption of the referendum in its most modern sense furnishes evidence that the government is yet in a formative period. There are additional evidences also of this in the demands for other advanced legislation such as is mentioned elsewhere in this article. This measure may be defined as the submission of a state law or city ordinance which has been passed by the duly organized legislative body to a vote of the people for final ratification or rejection. The machinery of the law differs considerably in the various states where the measure is in force; for instance, in South Dakota, where in 1898 the first act of the kind was passed, it is provided that the people may require a referendum vote on every act passed by the legislature, and only five per cent of the voters are required in that state to invoke the referendum on any measure. In other states only specified kinds of laws, such as financial and political measures, are subject to referendum vote, and from ten to twenty-five per cent of the voters must join in petition. The "Oregon Plan," adopted in that state in 1899 and extended in 1904, has been the model for other states in framing laws relating to popular control, including not only the initiative and referendum, but also the recall, direct primaries, popular vote for United States Senators, commission form of government, publicity of campaign expenses and corrupt practice acts. See OREGON, subhead *Government.*

The Initiative. The success of the referendum naturally invited experiments in the opposite direction. If the people could be

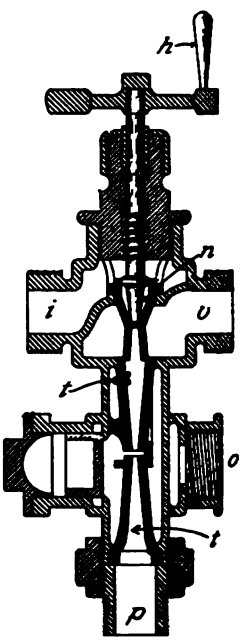
empowered to indorse or condemn a law passed by the legislature or city council why should not the same power take the first steps towards enacting laws? Frequently lawmakers, for reasons of their own, refuse to reflect the popular will and fail to enact laws the people demand, even though they are elected as the people's representatives. Under such conditions the initiative is a useful instrument, and by its operation the whole body of voters may become their own lawmakers, both in city and state.

Laws governing the initiative naturally vary. They are simplest in operation in cities, because issues are possibly better understood in small areas, the preparatory task less difficult and the number of voters smaller. In a state, however, the measure is fully as successful, even if a little more complicated. A small percentage of voters of a state, varying from five to twenty-five per cent, may file with the Secretary of State, or other designated officer, a petition for a needed law. Then the measure must come before the legislature, without amendment of any kind. If the latter rejects the proposition, in some states such action puts an end to the matter, while in others it serves to bring the question to a vote of the people of the state, over the head of the legislature, in a manner prescribed by law.

If carried by them it becomes a statute, for the governor is not permitted to veto a measure so passed. The most advanced initiative measure now in force provides that when the people petition for a law, the proposal is put up to the people for decision without reference first to the legislature. The latter body, in such instance, has no part in passing or rejecting the measure. The first provision of this kind was embodied in the Oregon constitution in 1902; the second, in Oklahoma in 1907. In a city the procedure is practically the same as in the state; the petition is presented to the city clerk, usually; the lawmaking body is the board of aldermen; the mayor cannot interpose a veto. In some cities a petition is sent direct to the board of aldermen, who must at once enact the measure into an ordinance or provide for its submission to vote of the people.

In the beginning of the year 1917 initiative and referendum laws were in force in twenty-one states. R.E.B.

INJECTOR, *in jek'ter,* a word derived from the Latin *injicere,* meaning *to throw in,* is applied to a mechanical appliance for supplying water to a boiler. The injector was invented by a Frenchman named Henri Giffard, and improvements upon his device are now in use on all modern boilers. It consists of an apparatus by which a jet of steam is brought into contact with a stream of water from a supply pipe. The steam, cooling, is condensed and imparts to the water a force sufficient to overcome a pressure equal to the pressure of the steam jet. The force thus accumulated drives the water through a pipe, from which it is admitted to the boiler by means of a check valve which prevents back flow or escape of water already in the boiler. The supply of water and steam can be regulated or altogether stopped by means of valves.



INJECTOR
Parts are explained in the text.

The accompanying illustration explains the principles of this useful device. Steam is admitted through the inlet *i,* forcing the air out of the tube *tt,* creating a vacuum in the water inlet at *v,* causing water to enter and surround the steam nozzle at *n.* The combined water and steam is forced into the pipe at *p,* whence it enters the boiler, the surplus water and steam finding an outlet at *o.* The steam flow is regulated by the handle *h.*

INJUNCTION, *in junk'shun,* in law, a judicial order requiring a party to do or to abstain from doing some particular act. The writ of injunction was introduced as a remedy for many common law abuses, and as an equitable remedy it is one of the most potent. A writ designed to prevent a wrong is known as *preventive;* that which operates to compel the performance of an act is called *mandatory.* In regard to the time when they are granted and the period they are to remain in force, injunctions are classed as *preliminary,* or *interlocutory,* and *perpetual.* A perpetual injunction is sometimes issued when, after arguments, the court decides that there are in the pre-

liminary writ valid grounds for its continuance; on the other hand, on final hearing of a case, a court not infrequently grants a perpetual injunction when a preliminary injunction has been denied. Common examples of preventive injunction are those issued to prevent violation of contracts, to protect patent rights and to prevent waste; an injunction to compel a person to restore a natural watercourse to the channel from which he had illegally diverted it would be classed as *mandatory*. R.E.B.

INK, a fluid substance used in writing and printing. Black writing ink is the most common, and the following is a good recipe for its manufacture in small quantities: one pound bruised nutgalls, one gallon boiling water, five and one-third ounces of sulphate of iron (copperas) in solution, three ounces gum arabic previously dissolved, and a few drops of an antiseptic, such as carbolic acid. Steep the galls for twenty-four hours, strain the infusion, and add the other ingredients. Logwood now often takes the place of nutgalls because of its cheapness. The iron in the copperas acts upon the tannin in the solution of the nutgalls and on exposure to the air turns this black. Copying inks are prepared by adding sugar, gum or glycerine to ordinary writing inks. Colored inks are solutions of coloring matter. Red ink is best prepared by dissolving pure carmine in ammonia; blue, by dissolving Prussian blue in oxalic acid; green, by dissolving one per cent methyl green in warm water.

Printing ink is made by mixing the best quality of lampblack with boiled linseed oil to which a small quantity of soap and rosin has been added. It is thoroughly ground and mixed thicker than paint. There are three qualities of printing ink: newspaper inks, book inks and lithographic inks. India or China ink, made of lampblack in very fine condition baked with a gummy substance, is the form in which ink was earliest prepared, and is still used in China and Japan for writing with small brushes instead of pens (see INDIA INK). It is prepared in the form of sticks, which are rubbed down in water for use, and is used by architects, engineers and artists generally. Marking ink used for marking linen is composed of a salt of silver, usually the nitrate dissolved in water and ammonia, with a little coloring matter and gum for thickening. Indelible, or incorrodible, ink is the name given to various combinations of lampblack with resinous substances. To remove ink stains from linen, alternately dip the parts in a weak solution of oxalic acid and hypochlorite of lime (or soda).

INNESS, *in'is*, GEORGE (1825-1894), an American master of landscape art, one of the greatest painters of natural scenery his country has produced, and the leading landscape artist of the early national period. He was an original personality in his field of painting—an artist of sincere convictions and of many moods and enthusiasms. His maturer art is an expression of his belief that the atmosphere of a picture is more important than the form, and so, though the lines of his landscapes often seem indistinct, in poetic sentiment and in their light and color they are wonderfully beautiful. Inness was born in Newburgh, N. Y. His parents recognized his liking for art and gave him what advantages for study the times then afforded, but the boy was too independent and impatient to profit by his instruction. Indeed it was not until he had studied in France for a year, in 1854, that he began to paint in the style that is characteristic of him; especially was he influenced by the painters of the Barbizon school (see BARBIZON PAINTERS).

On returning to America he opened a studio in Brooklyn, N. Y., then removed to Medfield, Mass. Near the latter city is the charming rural landscape which he reproduced in his well-known *Medfield Meadows*. In 1862 he took up his residence in Eagleswood, N. J., and during the last years of his life lived in or near New York City. He died while traveling in Scotland. Many honors, both at home and abroad, were accorded him. He was made a member of the National Academy and of the Society of American artists, and his *American Sunset* was selected as a representative work of American art for the Paris Exposition of 1867. In the days of his early painting his pictures could be purchased for $25; just after his death they sold for $2,000 and $3,000.

An especially fine collection of Inness paintings, to which a room is devoted, is possessed by the Art Institute of Chicago. There are his *Catskill Mountains, Millpond, Florida Pines, Threatening, Rainbow after a Storm* and others; the Metropolitan Museum, New York, has a collection of seven, including *Peace and Plenty, Delaware Valley* and *Spring Blossoms*. His well-known *Georgia Pines* and *Niagara* are hanging in the National Gallery at Washington, D. C., and he is also represented in the galleries of other American cities. R.D.M.

INNOCENT, *in'o sent,* the name of thirteen Popes, of whom the third had by far the greatest influence.

Innocent I, who was raised to the Papal chair in 402, ruling until his death in 417, maintained with a firm hand the right of the Roman Bishop to hear appeals from other churches, while his letters are filled with assertions of universal jurisdiction. Two years after he became Pope he induced Emperor Honorius to pass laws protecting the Catholics against the Donatists, a sect then powerful in North Africa, while some years later he strongly supported Saint Chrysostom, who had been unjustly deprived of the See of Constance. His last years were full of trouble owing to the damage done by Alaric, leader of the Goths, who pillaged Rome in 410.

Innocent II, who, in spite of much opposition from a faction of cardinals, was elected Pope in 1130, held the second Lateran Council in 1139, which confirmed the condemnations pronounced by several other councils on Abelard (see ABELARD, PIERRE) and the followers of Arnold of Brescia, leader of a revolutionary movement in the Church. Up to 1138 he had a hard time maintaining his position, although he was supported by Louis VI, the French bishops and Saint Bernard, for Anacletus II, who had been elected antipope, held possession of the Church of Saint Peter and much of the city of Rome until his death in that year. For the five years following, Innocent II held undisputed sway over the Church. He died in 1143.

Innocent III (1161-1216) was the greatest Pope by this name. His combined wisdom and strength in extending the spiritual power of the Papacy over temporal authority overcame the fears of all who thought him too young for the responsibility, for he was only thirty-seven when elected to the Papal chair. His chief aim was to establish the authority of the Church over the State. He began by restoring Papal authority in Rome, but soon his influence extended over all Europe. He compelled John of England to acknowledge the sovereignty of the Pope and pay an annual tribute; forced Philip Augustus of France to take back his queen, Ingeborg, whom he had tried to repudiate to marry Agnes of Meran; and instituted the Fourth Crusade, which resulted in the capture of Constantinople from the Greeks and the establishment of the Latin Empire (see CRUSADES). As a worker for public and private morality his influence was far-reaching, while at his death he was engaged in promoting peace among the Italian cities.

Innocent XI (1611-1689), who became Pope in 1676, was continually involved in conflicts with Louis XIV, in spite of the fact that he owed his election to the French party. The most serious one arose when he tried to put an end to the king's practice of keeping sees vacant and appropriating their revenues. The resistance to this attempt brought forth the celebrated declaration of the French clergy as to the "Gallican liberties." Innocent XI was a vigorous and judicious reformer, censuring many of the propositions of theologians which he considered morally lax.

Innocent XII (1615-1700), upon becoming Pope two years after the death of Innocent XI, followed the reforming plan of his predecessor, who had previously appointed him cardinal. During his pontificate he brought about a reconciliation with France after the French clergy had retracted the *Four Propositions of the Gallican Clergy,* which asserted that kings in temporal matters were independent of the Pope. G.W.M.

INNOCENTS, FEAST OF HOLY, also called INNOCENTS' DAY and CHILDERMAS, is a festival observed on the twenty-eighth and sometimes on the twenty-ninth of December, in commemoration of Herod's murder of the Bethlehem male children of two years and under (*Matthew* II, 16). The object of the massacre was the destruction of the infant Saviour. In the Roman Catholic Church these children are regarded as martyrs; their murder inspired the exquisitely beautiful hymn of Prudentius, entitled *Salvete Flores Martyrum.*

INNSBRUCK, *ins'brook,* a city of Austria, capital of the crownland of Tyrol, noted for its picturesque situation in a broad valley of the Alps Mountains, nearly 1,900 feet above the sea, and for its many historic associations. For three centuries after 1363, Innsbruck was the seat of residence for nearly all of the Tyrolese rulers of the House of Hapsburg. The city lies on both banks of the River Inn, and its name means *bridge of the Inn.* Lofty snow-capped mountains surround it on all sides, and its spacious streets and many famous buildings add to its attractiveness. In the city may be seen the oldest Capuchin monastery in Austria, begun in 1598, and a Franciscan church, dating from the sixteenth century, which contains a magnificent monument to the Emperor Maximilian I and a beautiful silver statue of the Virgin Mary.

Innsbruck possesses many splendid palaces, the oldest of which was erected in the thirteenth century; the Tyrolese National Museum, containing a picture gallery and a library of about 30,000 volumes, and imposing municipal buildings. Foremost among its educational institutions is the University of Innsbruck, founded in 1677 by Leopold I, and having a student body of over 1,300. In the outskirts of the city are the beautiful and historic Isel Mountain and the famous medieval Ambras Castle, with a celebrated collection of weapons. Cotton and wool spinning, glass painting and the manufacture of mosaics are important industries. The city is the seat of the Court of Appeals for Tyrol and the neighboring crownland of Vorarlberg. Estimated population in 1914, 57,300.

INOCULATION, *in ok u la'shun,* in medical practice, the injection of a preparation into the tissues or fluids of the body, for the purpose of preventing or curing certain diseases. The material injected consists usually of a weakened culture of the germs causing the disease, called virus, and it acts by destroying the bacteria which are then or may later be present in the blood. *Preventive* inoculation is illustrated by vaccination to protect from smallpox, and by the injection of antitoxins to ward off diphtheria, lockjaw, typhoid fever and other infectious diseases. *Curative* inoculation consists in injecting the virus after the disease has started. The protection afforded by preventive inoculation does not continue indefinitely, but must be repeated in a variable number of years according to the disease. Inoculation was used with remarkable results in the War of the Nations, which began in 1914; in spite of the vast numbers of men engaged, serious outbreaks of epidemic diseases were prevented by its use. See ANTITOXIN; VACCINATION; DISEASE, subhead *Germ Theory of Disease.* S.C.B.

INQUISITION, *in kwi zish'un,* a tribunal in the Roman Catholic Church, known officially as the Holy Office, whose function was the discovery, suppression and punishment of heresy. From the time of the Emperor Constantine (274-337), the teachings of the Christian Church were regarded as the foundation of law and order, and heresy was therefore deemed an offense against the state, as well as against the Church. Constantine's zealous efforts to suppress all forms of unbelief were continued for several centuries by his successors who coöperated in this work with the bishops.

In the twelfth and thirteenth centuries the activities of such heretical sects as the Albigenses and Waldenses (see ALBIGENSES; WALDENSES) aroused the Church authorities to the need of increased vigilance, and from the year 1227 the suppression of heresy was intrusted to a permanent tribunal, under the special direction of the Dominican Order. The Inquisition was thereafter a general court instead of a local tribunal.

Its mode of procedure was essentially as follows: The person suspected of heresy was arrested and brought before judges to be tried, the proceedings being usually conducted in secret. The accused had the right to make known his enemies, whose evidence would be excluded. Though a confession of guilt was sometimes extorted, such a confession, to be accepted, had to be repeated afterwards without compulsion. As a punishment, those convicted had to make pilgrimages, wear a badge (such as the yellow cross) as a sign of disgrace, or be sentenced to imprisonment and, in extreme cases, to death. The death penalty, however, could be inflicted only by the state, and was resorted to in comparatively few cases. Between 1308 and 1322 only forty persons of 636 convicted of heresy were condemned to death.

The Inquisition as it developed in Spain met the condemnation of Protestants and Catholics alike. As reorganized under Ferdinand and Isabella, who used it as a weapon to suppress the conspiracies of the Jews against the government, the Holy Office became a state tribunal controlled entirely by the royal power. Many of the cases that came under its jurisdiction were crimes such as are to-day tried by the civil courts. Its work began in 1486, and though several times suppressed, it was not abolished until 1834. During this period many executions took place, but the number has doubtless been exaggerated. A conservative estimate places the number at 4,000. Heresy was rarely, if ever, punished by death at Rome. There the Congregation of the Holy Office still exists, but its chief work now is the suppression of heretical writings (see INDEX EXPURGATORIUS). G.W.M.

INSANE ASYLUM. See INSANITY, subhead *Insane Asylums.*

INSAN'ITY, from a Latin word meaning *unsound,* is a general term applied to various forms of mental disorder, produced by defects or disease of the brain, the organ of the mind. These forms of mental unsoundness are divided

into two classes, *congenital* (existing from birth) and *acquired* insanity. The former is due to imperfect brain development and is known as *imbecility* or *idiocy*. Persons afflicted with this form of mental disorder are not violent, but dull, and as a rule are incapable of much more than routine physical acts (see FEEBLE-MINDED, EDUCATION OF THE).

Physicians recognize three general forms of acquired insanity, though various other classifications might be given. These are *mania* (see MONOMANIA), *dementia* and *melancholia*. Mania is characterized by loss of natural self-control and abnormal development of the emotions. The victim acts and speaks in an extravagant manner, is given to excessive indulgence in eating and drinking, and if reproved or corrected may give way to wild outbursts of anger. Persons suffering from mania frequently imagine they have vast sums of money, great fame or prodigious strength of body. Dementia is marked by mental weakness similar to that of idiocy, its symptoms including loss of memory, childishness, decrease of will power and confusion of thought. Melancholic patients suffer from great depression of spirits, and the mind is occupied with dark forebodings. Not infrequently melancholia results in suicide.

The most common causes of insanity, other than heredity, are loss of friends, business troubles, overwork, religious excitement, alcoholism, injuries to the head, old age, and numerous physical causes arising from disease or vicious habits. For the treatment of the insane, see subhead below.

Insanity is frequently advanced as a ground for defense in cases where crime has been committed. The ruling generally followed in American, Canadian and British courts is that to establish a defense on the ground of insanity it must be clearly proved that at the time the act was committed the person accused was so diseased in mind that he did not know the nature of his act, or if he did know it, he did not understand that the act was wrong. Another legal aspect of the case concerns the capacity of an insane person to make or draw up a will. In general, a contract made by an insane person is void or voidable, but a will may be declared valid.

Insane Asylums. Formerly the term insane asylum was applied almost universally to institutions for the treatment of the insane. At the present time *asylum* is giving way to the more appropriate word *hospital*, for the modern idea is to cure, not to imprison. Humane and enlightened methods of caring for those of unbalanced mind date only from the beginning of the nineteenth century. Instead of the unsightly and comfortless prison-house of former times, with its cells and strait-jackets, its chains and instruments of torture, may now be seen the tasteful and comfortable home, with neat sleeping apartments, cosy dining rooms, curtained windows and attractive rugs and pictures, while sewing rooms, schools, shops and gardens provide healthful and interesting forms of occupation.

The beneficial effects of rest and work, exercise and recreation, and contact with nurses and physicians who are hopeful and cheerful, are fully recognized in the modern treatment of the mentally afflicted. In some cases physical disorders must be treated before the mental condition can be improved. Attention to diet, massage, baths and soothing drugs for patients suffering from sleeplessness and nervous excitement are familiar measures of relief. Germany has developed the most nearly ideal method of caring for the insane in its colony system. By this is meant a number of cottage homes grouped about industrial centers, those patients who are able to do farm work living near the fields, meadows and gardens; others, brickmakers and generally skilled workmen, are settled near their scenes of labor. The colony is really a small village, where the able-bodied are provided with a suitable occupation and the sick and crippled are cared for in a hospital or infirmary.

In America, where there are nearly 190,000 patients in hospitals for the insane, the majority of institutions are under state control. Some of the states maintain county insane asylums or insane departments of county almshouses, as well as state institutions. The states also vary in their rules for admitting patients. In some, for example, feeble-minded and idiotic persons are admitted to insane asylums and in some they are provided for in special homes. In some states the hospitals for the insane receive epileptics, whether insane or not; in others, confirmed drunkards are treated in institutions for those of unsound mind. Each of the Canadian provinces cares for its own insane. There are in the Dominion about 21,000 persons who are mentally unbalanced. B.M.W.

Consult Ramaley's *Insanity, Its Nature, Causes and Prevention;* Brower and Banister's *Practical Manual of Insanity.*

INSECT, one of the numberless little creatures which constitute, in many different kinds, more than half the animal kingdom. Insects include butterflies, bees, grasshoppers and ants, mosquitoes and flies, beetles, and scores of thousands of other varieties. Though we usually think of them as our enemies, insects are in many ways very useful to man, and it is said that without them the earth would soon become uninhabitable. If we did not have the bees and other insects which carry the pollen of flowers we should have almost no fruit. Some of our most beautiful flowers depend on insects which carry the pollen from one blossom to the blossom of another, so that good seed may set. Some insects also act as scavengers, because they feed on dead and decaying animal and vegetable matter. Honey, silk and beeswax are made by insects, and also a less-known but valuable product called lac, from which lacquer and shellac are derived. But the greatest good done by insects is effected by those parasitic kinds that keep the destructive kinds in check.

The destruction caused by insects will lessen as our knowledge of them increases. The leading governments employ trained men called *entomologists,* whose business it is to learn how to check insect pests, and to teach their discoveries to farmers and fruit growers. It has been found that many of the most destructive insects are those that have been accidentally brought in from a foreign country without the introduction of parasites which prevent their increase, so entomologists are now trying to find and import these parasites. For example, by importing a beetle from Australia entomologists checked a scale insect which was attacking orange and lemon trees in California.

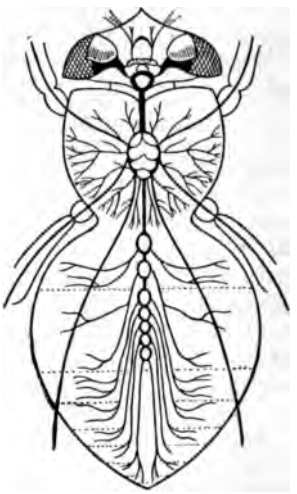
Social Insects. What appears to be a high degree of intelligence, though most scientists say it is merely instinct, is displayed by the social insects, those which live together in communities (see INSTINCT). Of these, the ant, the bumblebee and honeybee, and the social wasps are the most commonly observed; their remarkable life is described under their respective headings elsewhere in these volumes. The ambrosia beetles have galleries beneath the bark of trees, and cultivate the fungus upon which they live as a man cultivates a garden. Caterpillars often feed together in great numbers. In crossing what to them is desert, a gravel path, they travel in caravans, the head of each close to the tail of the one just ahead.

The Developing Insect. A striking fact about insects is that many of them when hatched bear no resemblance to the mature, fully-developed specimen, called the *imago* (image). The butterfly, which lives first as a caterpillar, or *larva,* then as a *chrysalis,* or *pupa,* within a cocoon, before appearing as its beautiful winged self, is a familiar example. The maggots which become flies, and the grubs which develop into beetles and other insects are also *larvae,* corresponding to the caterpillar. Their second form, in which they quietly remain while developing into the *imago,* is called the *pupa.* This development through very different preliminary stages is called *metamorphosis,* a word which means *transformation.* Some insects have only partial metamorphosis, others none. The young locust, for instance, is distinguished only by lack of the wings which it later acquires.

Definition. The name *insect* is given by many people to almost any small crawling creature. In science it refers only to one class, the members of which are most easily distinguished by their three pairs of legs. Thus a spider is not an insect, for it has four pairs of legs; nor, of course, is a centipede. Insects are also distinct in having the rings composing their bodies grouped in three parts, the head, thorax, and abdomen, and in breathing by means of air-tubes branching through their whole body. Wings are characteristic except in some degenerate forms.

Structure. The insect does not breathe through its mouth. Its extensive system of air-tubes derives air from nine or ten pairs of

openings in the side of the body, usually eight pairs of them in the abdomen, which have grates of stiff hair to keep out the dust. An insect may be asphyxiated by coming in contact with something greasy or oily, if a film of oil spreads over its *spiracles,* air openings. An insect has no bony skeleton; its principal nerve cord extends along the underside of the body. Its brain, because of the many movements controlled, is complex. Its heart is a pulsating tube of several chambers, extending through the insect's whole length. The blood, yellowish-white or greenish, flows everywhere in the body without passing through arteries and veins; it nourishes and purifies the whole system. An insect has claws to use in climbing. From the ends of hollow hairs which fringe the cushion between the claws comes a sticky fluid which helps flies to walk on glass or to travel with ease upside down on the ceiling.



NERVOUS SYSTEM OF AN INSECT

Senses. Insects have the five senses known to man. It is possible that they have others of which man does not know the nature because he does not possess them himself. Smell seems to be the sense upon which they rely most. In the *antennae,* or feelers, which are attached to the head, are very small pits, the organs of smell; June beetles have nearly 80,000 such pits. With the antennae insects also feel, and in some cases hear. On a locust the organs of hearing, more nearly corresponding to human ears, are on the sides of the abdomen; on katydids and crickets they are on the forelegs. Insects usually have three *simple* eyes on the top of the head, and two *compound* eyes, each made up of from a dozen to 30,000 single eyes. But their sight seems to be very limited.

When it is remembered that most insects are but a fraction of an inch in length, the exceeding smallness of the organs described above is apparent.

Food and Location. Most insects feed on vegetable matter, either living or dead, some on decaying flesh, some on the tissues of live animals; others are *parasites* (which see). They are found anywhere where there is food for them to eat, even in the Arctic regions. Though some live in the water all or part of their lives, there are no insects in the sea. Nearly all perish in winter, only their eggs remaining to perpetuate their species.

Classification of Insects. Karl von Linné (Linnaeus), in the eighteenth century, arranged insects, according to their wings, in seven classes. Entomologists now distinguish nineteen classes, but Linné's names are retained for the seven principal ones. It will be noticed that most of the names end in *-ptera,* the Greek word for *wings.*

1. *Aptera* (wingless) are primitive insects, including the springtails, seen in large numbers on the surface of pools.

2. *Coleoptera* (sheath-winged) are the beetles. The fore wings are leathery and veinless. The hind wings are broad and membranous and fold up under the fore wings when the beetle is at rest.

3. *Corrodentia* (gnawing) include book lice.

4. *Diptera* (two-winged) are the true flies: mosquitoes, house flies, horse flies, botflies and others.

5. *Ephemerida* (lasting-a-day) are the May flies, familiar to people who live on lakes or rivers.

6. *Euplexoptera* (wings well folded) are the earwigs, recognized by forceplike appendages on the tip of the abdomen.

7. *Hemiptera* (half-winged) are sucking-bugs, among which are the chinch bugs, scale insects, plant lice, "kissing bugs," and the large water bugs that fly about arc lights. Their mouths are specially formed for sucking juice or blood.

8. *Hymenoptera* (membrane-winged) embrace bees, ants, wasps, gall-flies. All the *social insects* except the termites are included in this division. The habits of an interesting member, the fig-wasp, are described in the article FIG.

9. *Isoptera* (equal-winged) are the white ants or termites which in Africa and South America build huge mounds and eat the timbers of houses.

10. *Lepidoptera* (scaly-winged) are best known to us as butterflies and moths. The silkworm is a larva of a moth now domesticated. This moth and the honeybee are the only domesticated insects.

11. *Mallophaga* (hair-eating) are the bird lice. They do not suck like the *hemiptera* lice, but bite off bits of feathers.

12. *Mecoptero* (long-winged) include small, wingless, shiny black insects which leap in the snow, and the scorpion flies.

13. *Neuroptera* (nerve-winged) contain the ant-lions, which dig pits into which their prey, the ants, fall.

14. *Odonata* (of uncertain meaning, from the word for tooth) include the dragon flies or "devil's darning needles," which destroy vast numbers of mosquitoes.

15. *Orthoptera* (straight-winged) include the cockroaches, crickets, locusts, grasshoppers and katydids, and the walking sticks.

16. *Plecoptera* (plait-winged) are the stone flies, whose *nymphs*, or young, are found on the underside of stones in brooks.

17. *Siphonaptera* (tubed, wingless) are fleas.

18. *Thysanoptera* (tassel-winged) are thrips, very small insects living on flowers and vegetables.

19. *Trichoptera* (hair-winged) are the caddice flies, which build houses of sand, pebbles or wood in streams and ponds. V.L.K.

Consult Kellogg's *Insect Book;* Comstock's *Ways of the Six Footed;* Foot's *Insect Wonderland;* Church's *Flyers and Crawlers;* Cragin's *Insect Friends and Foes;* Howard's *Insect Book;* Selous' *Romance of Insect Life;* Weed's *Insect World;* Gibson's *Blossom Hosts and Insect Guests;* Marks and Moody's *Little Busybodies.*

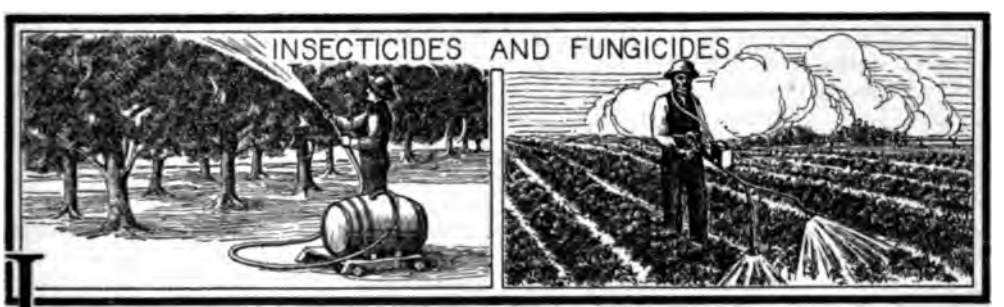
Related Subjects. All of the important kinds of insects are described in these volumes. The reader is referred to the following articles, which include not only discussions of specific insects but other articles of general interest:

KINDS

Ant
Ant-lion
Aphides
Army Worm
Bedbug
Bee
Blowfly
Boll Weevil
Botfly
Brown-tail Moth
Butterfly
Cankerworm
Carpet Beetle
Chinch Bug
Cicada
Click Beetle
Cockchafer
Cockroach
Codling Moth
Cricket
Death's-head Moth
Deathwatch
Dragon Fly
Firefly
Flea
Fly
Gnat
Grain Beetle
Grasshopper
Gypsy Moth
Hercules Beetle
Hessian Fly
Honey Locust
Horse Fly
Ichneumon Fly
Jigger
June Bug
Katydid
Lace-winged Flies
Ladybird
Leaf Insects
Locust
Louse
Mantis
May Fly
Mealy Bug
Mole Cricket
Mosquito
Moth
Potato Bug
Scale Insect
Scarab
Scorpion Fly
Sphinx Moth
Stag Beetle
Termites
Tsetse Fly
Tussock Moth
Walking Stick
Wasp
Water Bettle
Water Bug
Weevil
Wireworms
Yellow Jacket

GENERAL TOPICS

Antennae
Beetle
Bug
Caterpillar
Chrysalis
Hemiptera
Hornet
Insecticides and Fungicides
Larva
Lepidoptera
Metamorphosis
Neuroptera
Orthoptera



INSECTICIDES AND FUNGICIDES, *in sekt'i sides, fun' ji sides.*

These terms, which appear rather technical, mean literally *insect-killers* and *fungus-killers.* The farmer and the gardener of all people in the world must be thoroughly acquainted with them if they are to be successful. For at every stage in their operations, whether it be the young plant, the blossom, the maturing fruit or the seed that they are watching, there are insect and fungus pests ready to make care and labor of no avail. Sometimes the same preparation is effective against both kinds of pests, but there are some effective for one and not for the other.

Insecticides, or Insect-Killers. Some insects, as caterpillars, beetles and grasshoppers,

feed upon the tissues of the plants, biting or gnawing them, and in consequence any poisonous substance placed on the plant is eaten by them. Other insects, however, as the plant lice and the scale insects, suck the sap of the plants and thus cannot be poisoned in so simple a manner. Indeed, some of these sucking insects resist any treatment ever devised, and are thus among the most dangerous of all plant enemies.

Of the "stomach poisons," which kill the biting or gnawing feeders, the most effective are those containing arsenic, the two described below being as valuable as any:

Kedzie Mixture. To eight pounds of carbonate of soda—the common sal soda—add two pounds of white arsenic, and boil the whole in two gallons of water until the arsenic is dissolved. This solution is poisonous in the extreme, and should always be so labeled. When it is to be used, one pint is added to forty gallons of water, into which is also stirred two pounds of lime, slaked. The mixture is then sprayed upon the affected plants, but care should be taken never to spray this or any other poison upon lettuce or other salad plants, or upon such plants as spinach, of which the whole plant is eaten.

Arsenic Solution. This differs very little from the compound just described. Four ounces of Paris green and two pounds of slaked lime are dissolved in forty gallons of water, and the resultant mixture is used as a spray. In this solution may be soaked slices of potato, which are then placed about the roots of plants that cannot be sprayed.

"Contact" Poisons. The sucking insects are usually killed by what are known as "contact" insecticides—that is, by those which actually affect the body of the insect, and not its food. Either corrosive or suffocating substances are most used, and sulphur and carbon disulphide fumes play a large part. The most popular of these contact insecticides, however, is kerosene, but since few growing plants can be treated safely with pure kerosene, the following mixture is commonly used:

Kerosene Emulsion. Dissolve eight ounces of hard soap in a gallon of boiling soft water, and add two gallons of kerosene. Mix or churn the whole, violently. When this is needed for spraying it is diluted by the addition of from twenty to forty gallons of water.

Whale-oil soap is also an excellent insecticide, one pound of the soap being dissolved in from one to ten gallons of water.

Fungicides, or Fungus-Killers. These, like the insecticides, are sprayed upon growing plants, but the spray must be finer, so that no drops remain upon the leaves. Some are especially adapted to the preservation of seeds or of fruit.

Bordeaux Mixture, the best fungicide for general purposes, is made as follows: In a wooden vessel dissolve five pounds of copper sulphate (blue vitriol) in five gallons of water. This can best be done by suspending the sulphate in a coarse cotton bag in the water. To neutralize the corrosive power of the vitriol, add a solution formed by slaking five pounds of fresh lime in five gallons of water. Pour this compound into fifty gallons of water and mix violently. This solution is known as the five-five-fifty, from its proportions. If plants with very young leaves, or such delicate trees as the peach and the plum, are to be sprayed with this mixture, twenty-five gallons more of water and an extra pound of lime should be added.

Copper Sulphate Solution. This is a valuable mixture in which to soak the seeds of barley, oats or wheat that are in danger of fungus affection. It must not be used as a spray, as it has a corrosive effect on the foliage. To make it, simply dissolve one pound of copper sulphate in two gallons of water.

Copper Carbonate Solution. Some sprays, including the Bordeaux mixture, will discolor, and so may not be used on fruits, or on foliage that must be kept green. The solution formed by adding to ten gallons of water an ounce of copper carbonate dissolved in a pint of ammonia has no such fault.

Sulphur. This simple fungicide is very useful in the hothouse. It is sprinkled freely on the steam pipes, or on some other surface warm enough to vaporize it, and is usually effective in killing off all fungi. The greatest care must be taken, however, not to set fire to the sulphur, as growing plants are quickly killed by sulphur fumes. A.McC.

INSECTIVORA, *in sek tiv' o ra,* from two Latin words, *insectum,* meaning *insect,* and *vorare,* meaning *to devour,* is the name applied to an inferior order of small, timid mammals, which prowl at night and feed chiefly on insects. Their teeth are tipped with small projections, by means of which they can easily break the hard outer insect shell. The legs of insectivora are short, and the animals walk with their feet flat on the ground. The order is one of the most ancient of the mammalian groups. See HEDGEHOG; MOLE; SHREW.

INSIGNIA, *in sig'ni a.* See UNIFORMS AND INSIGNIA.

INSOM'NIA, or **SLEEPLESSNESS,** is inability to sleep. It is a condition caused by undue excitement, mental and physical exhaustion, worry, alcoholic excesses, indigestion and other causes mentally or physically disturbing. The rational treatment consists in the removal of the cause, supplemented by hot baths, gentle massage, fresh air, etc. The use of drugs to effect a cure cannot be too strongly discouraged. Persistent insomnia tends to add other ills for the victim to bear in addition to those causing sleeplessness, for it weakens the constitution and makes it easier for serious ailments to attack the body. Cases are on record in which absolute insomnia lasted for weeks, interrupted only by a few moments of sleep. Physicians declare that a person who has always a good appetite and can sleep soundly every night the requisite number of hours is in a state of practically perfect health. The "many-sided Franklin" gave good advice in his essay entitled *On the Art of Procuring Pleasant Dreams.* W.A.E.

INSTINCT, *in'stingkt,* in animals, including man, is the power which enables an individual to perform an act without previous experience or observation of the act or its effects. Instinct causes a chick to scratch the ground, a bird to build its nest, a wasp to feed its larvae (young), or a baby to cry. The word is not exactly defined, for psychologists and biologists hold differing opinions regarding it. In general, however, scientists distinguish instinct from unconscious reflex action (see REFLEX ACTION), such as is produced in the lowest animal forms by changes of temperature, and from intelligence, which includes the ability to profit by experience, and implies the capacity of dealing with ideas as well as objects.

An act is instinctive, speaking generally, only the first time it is performed. Afterwards experience is to some extent a factor in prompting the act and in altering the method of performing. Thus intelligent behavior is characteristic of the individual, instinctive behavior of the species. Each spider weaves its web much as any other of the same species, the similarities being due to instinct, the differences to individual experience. Sometimes, therefore, instinct induces an action which intelligence would condemn. We have all seen a startled rabbit "freeze" and remain motionless until it thinks all danger is past. This it does by instinct, for as a rule rabbits attract less attention when still. But in individual cases the rabbit may be endangered instead of protected by obeying this instinct, as, for example, when a white rabbit stops in front of a dark background.

Truly instinctive acts are observed in the insects which live but one season. The *solitary* wasp, before sealing the cell in which it has laid an egg, puts in food for the larva. It then deserts the cell; the wasp which originates in the egg will certainly not be profiting by experience or observation when it repeats the process in the next generation. The solitary wasp, too, builds a hexagonal cell, just as do *social* wasps and honeybees. A round cell would appear to serve the purpose, but instinct preserves the hexagonal form.

IN'STITUTE OF FRANCE, the name given to a group of societies united into one body under the patronage of the French government; its history covers, to a certain degree, the intellectual and social development of the French people. In its present organization the Institute embraces five Academies:

(1) The French Academy, organized by Richelieu in 1635, devoted to the French language and to criticism of literary works. Its members are often called the *Forty Immortals.* The public has in fancy created a "forty-first chair" in which Molière, Rousseau, Dumas, Balzac, Daudet and Zola have been seated. To be elected a member of the French Academy is one of the highest literary honors France can bestow.

(2) The Academy of Inscriptions and Belles Lettres, nicknamed the "little Academy," founded in 1663, devoted to the study of antiquities, inscriptions and ancient and Oriental languages.

(3) The Academy of Sciences, founded in 1666, for the promotion of mathematics, physics, astronomy; in fact, the entire scientific field.

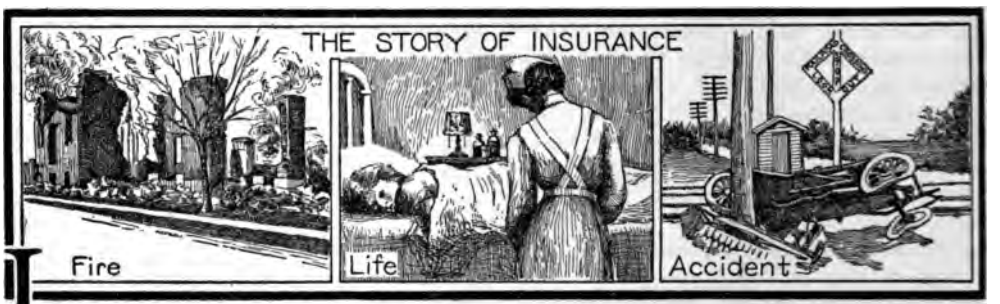
(4) The Academy of Fine Arts, founded in 1648, devoted to music, painting, sculpture and architecture. It has brought out many valuable art works.

(5) The Academy of Moral and Political Science, founded in 1795, suppressed in 1803, but restored in 1832, given to the discussion of philosophy, psychology, history, finance, law and political economy.

The Institute of France gives over $20,000 annually in prizes for the best work accomplished in its various departments. The members receive a small salary. Each academy has its own officers and funds, although the collections and libraries are held in common. The general fund is in charge of a committee of two from each academy, which acts with the minister of public education, its chairman.

IN'SULATOR, a substance used to prevent the passage of electricity, heat or sound; in

other words, something through which these forces will not pass. In the transmission of electric currents insulators are as important as conductors, since electricity can be collected only by their use. A body is said to be insulated when it is supported by some non-conducting substance, the best insulators being made of glass, rubber, gutta-percha, porcelain, resin, paraffin, sulphur and dry silk. In order that the electric current may pass along telegraph, telephone and electric-light wires instead of escaping into the earth, the wires are covered with paraffined cloth, vulcanized rubber or silk. The most common insulators on overhead wires are glass or porcelain knobs, made in the form of an inverted cup, and used at the points where the wires are supported on the poles. No insulating substance has thus far been found which will wholly prevent electrical leakage. See ELECTRICITY.



INSURANCE, broadly speaking, is protection against loss. Life gives rise to hazards, some of which can be foreseen more or less clearly; some, like death, are altogether beyond reckoning. It is the same with every human enterprise. No one can say what ships will come to port, what houses or factories will be destroyed by fire. Chance alone, or circumstances so numerous or uncertain that they can never be taken fully into account, determine the hazards.

As long as these greatest of all risks have to be assumed by the individual, enterprise is paralyzed. A ship merchant, for example, who is quite ready to shoulder a reasonable risk, will hesitate to engage his fortune in a venture the failure of which will involve total ruin. Such hesitation is only reasonable prudence, and ruinous risks have therefore to be assumed coöperatively by groups. Insurance has thus a considerable social significance; it binds men together by uniting their interests.

Losses which would be ruinous for any one manufacturer can be rendered relatively slight by being distributed among a large number of manufacturers. The owner of a plant is, therefore, willing to pay a certain stipulated sum each year into a common fund, in return for the assurance that in case his buildings are destroyed by fire or damaged by an explosion he will be protected against loss. He pays a certain definite sum for the privilege of having others share with him the risk of loss. The total fees so paid must be more than the total losses incurred by the group in any one year. This is *insurance.*

The intricate structure of modern business has given rise to many kinds of insurance: insurance against fire (fire insurance); insurance against shipwreck (marine insurance); insurance against breakage or damage to property through accident, or loss of future earnings through disablement (accident insurance); indemnification of the family in case its breadwinner is removed by death (life insurance). Under these main branches there are many further classifications, as well as insurance against sickness, unemployment and the like. The risk may be assumed by commercial corporations as a business or distributed coöperatively among the members of a fraternal or labor organization. By far the greater part of insured values are intrusted, however, to the great joint-stock and mutual companies, many of which carry risks throughout the world.

Organization. Joint-stock companies and mutual companies write most of the insurance policies; the latter are more numerous but the former carry risks many times as great. The definiteness of the obligation assumed by those who insure in stock companies has doubtless had much to do with their relative popularity. The client of a stock company (called the insured) pays a certain stipulated sum (the premium) annually, in return for which the corporation (the insurer) engages to pay cer-

tain amounts in case of loss from specified causes. In the simplest form of mutual companies funds necessary to meet any loss are raised by assessment after the loss has occurred. In practice, however, the old mutual companies require the insured to pay a regular annual premium, holding him further responsible for his share of any additional amount that may be required to pay losses. This liability is usually limited to a fixed amount or to a certain proportion of the cash premium. Many small mutual companies, writing premiums in a restricted territory, have come into existence within recent years; they represent often the coöperative enterprise of farming communities. Such organizations as the Modern Woodmen of America and other fraternal groups issue policies according to the mutual scheme.

Fire Insurance. The working of averages, which is of the utmost importance in insurance, is well illustrated in the case of fire insurance. Statistics are carefully collected by all companies. They show how many buildings of a certain kind were destroyed by fire, on the average, each year during a long period of time. It is assumed that the future will be like the past, and that the average number of buildings in a given kind and in given surroundings so destroyed will not vary greatly. For example, the figures may show that one pickle factory out of every thousand burns down each year, on the average. Consequently, it is assumed that the risk run by any one pickle factory in any future year is about one in one thousand. The rate is fixed accordingly, being as nearly proportionate to the risk as possible. The greater the risk, the higher the premium charged.

The applicant for insurance and the company enter into a joint agreement, which is written out in the form of a policy, or contract. The great companies have now standardized their policies, which are practically uniform. They contain explicit statements as to the liability of the company in case of loss and indicate under what conditions the insurer's benefit will be forfeited. The applicant, for example, is required to inform the company of all circumstances known to him which may affect the nature of the risk; he must give the location of the property and the kind of business conducted in it. If he is insuring a dwelling, he will usually be obliged to say that he does not intend to store in it any particularly inflammable or explosive substance. His integrity and moral character are of interest to the company insuring him, since fires are often purposely started in order to defraud insurance companies.

On this account, fire insurance policies are not transferred when property is sold; though in practice, companies usually allow such transfers on obtaining the proper signatures. If wilful misrepresentation or any attempt to defraud the company can be shown, it will usually be freed from its obligation to make good any losses. When partial losses occur, the usual practice is to reach a satisfactory adjustment, but in case such an adjustment proves to be impossible, the company often reserves the right to pay for repairs. When the loss is total, the owner recovers the full amount of his policy, if his property reaches that value.

Fire insurance covers all loss due either directly or indirectly to fire. Thus it includes loss by lightning, if the lightning is accompanied by fire. It includes also the damage caused by water used to extinguish the fire, and the destruction of buildings blown up to check a conflagration, as well as the injury done to property in removing it from burning buildings.

Accurate figures as to the exact number of insurance companies and the total risks they carry are not obtainable. It is estimated that there are approximately 2,000 companies. The risks carried in 1915 by the companies operating in New York state alone were in excess of $50,000,000,000. The premiums received amounted to $396,549,677 and the losses paid to $224,639,583. The average rate of the premiums in 1912 was about $8.90 for each $100.

Marine insurance is, in its large features, rather similar to fire insurance. One of the notable differences is that marine policies, like life policies, are readily assignable.

Life Insurance. Two motives inspire men to carry life insurance. Either they wish to provide for their families after their death, or they wish to make a safe investment at a reasonable rate of interest. The form of the life policy has been made extremely flexible so as to accommodate a great variety of human needs. With all the variations it would be quite impossible to deal in such an article as this. Important general classifications are *life* policies and *endowment* policies.

Under the life policy, the insured agrees to pay a fixed premium annually for life or during a specified period or in a lump sum, in return for which the company obligates itself

to pay a certain sum to his heirs or to any named person after his death. Under the endowment plan, the company agrees to pay a certain sum to the insured himself at a future time, as ten or twenty years. If he fails to survive the term, a certain payment is made to his heirs. Endowment policies are now much favored as investments. However the policy be written, it is essential that the premiums together should pay all the losses and all the expenses of the company, plus interest on the capital invested. The rate is determined in accordance with the principle of averages. By reference to mortality tables (see MORTALITY, LAW OF), it is possible to determine with a reasonable degree of closeness how long a person of a given age will survive. The likelihood of a long continuance of life is much less in the case of elderly than of young persons; accordingly, the rate increases with the age of the insured. Persons in bad health are often rejected as an unwarrantable risk. Those occupied in especially hazardous employments are obliged to pay a higher rate.

Under the *tontine* plan, profits are not divided until after the lapse of a specified period —ten, twenty or thirty years. Often the insured agrees to forfeit his policy in case he allows his payments to lapse. No dividends are credited to such policies as fall due before the dividend period arrives. The accumulated dividends are distributed at the end of the period among such policies as are actually in force at that time.

The life insurance in force in 1915 in the United States and Canada amounted to over forty billion dollars.

Since almost any commodity can now be insured, the varieties of insurance are too numerous to be given. Some of the chief forms, not enumerated above, with the amount in force in 1915, are as follows: personal accident and health, five billion dollars; steam boiler, $750,000,000; plate glass, $175,000,000; burglary, $80,000,000.

Insurance against sickness, accident and old age has become an exceedingly important part of the social program of Germany and other European countries, and the idea meets with growing favor in North America. In the United States such insurance schemes have been adopted by a number of large industrial organizations for the benefit of their employees. The popularity of sick benefits has been such that many companies have been organized to offer insurance against sickness, agreeing to pay from $10 per week to $50 per week or more in case of illness requiring medical or surgical care. A.E.R.

Consult Gephart's *Principles of Insurance;* also the reports of the insurance commissioner of your state or province.

Insurance, in Arithmetic

In teaching insurance to young people at school, there should be a discussion of the subject in class, full and free enough to enable them to understand the meaning of insurance in the business world, and to become familiar with the technical terms peculiar to the subject; as *insurance, policy, rate, face of policy, premium, underwriters,* etc. The students can get much information on this subject from their parents, neighbors, and business men in their neighborhood. Why are the rates of fire insurance high or low? What is the effect on rates of the location of insured property, of better fire protection, of fireproof building, of fewer fire departments, of better water supply, of nearness to sources of danger? Are rates lower in city or country? Are rates lower for apartment buildings or individual houses, etc.? All these questions can be a source of keen interest. With a clear understanding of the practical side of the subject, the arithmetic arising from it is a simple matter.

Premium, or the money paid to the insurance company for "taking the risk," is expressed as a per cent of the insurance, or, as so much per $100. For example:

(*a*) What is the premium paid for insuring a barn for $3800 for 3 years at 1¼%?

Solution:
Insurance = $3800
Rate = 1¼%
Premium = .01¼ × $3800 = $47.50

(*b*) What is the premium for insuring a stock of goods valued at $240,000, for ⅝ of its value, at $1.60 per $100?

Solution:
Insurance = ⅝ of $240,000 = $180,000
Premium = 1800 × $1.60 = $2880.00

Problems. 1. What does it cost a farmer to insure his growing crop of wheat for $24,000 at $2 per $100?

Solution:
Insurance = $24,000
Rate = $2 per $100
Premium = 240 × $2 = $480

2. A lake steamer is insured for $250,000 at 5% per year. What premium is paid in 6 years?

Insurance = $250,000
Rate = 5% per year
Premium for 6 years = 6 × .05 of $250,000 = $75,000

3. A farmer paid $28 for insuring a shipment of hay at 1¾%; what was the face of the policy?

Solution:

$28 = .01¾ of face
$28 = .01¾ × face

$$\text{Face} = \$28.00 \div .01\tfrac{3}{4} = \$2800 \times \tfrac{1}{7} = \$1600$$

The student should come to see how the scope of insurance has broadened until we find it possible to be guarded against loss of almost any kind by the many and varied kinds of insurance—burglary, automobile, fire, storm, flood, drought, building contractor or accident.

Life Insurance. Ordinary life insurance policies are taken out at so much per $1000, premium to be paid annually. For example, a man takes out a $5000 policy at $25.50 *per $1000.* His annual premium is 5×$25.50, or $127.50, during his lifetime.

There are other insurances, as *limited, endowment* and *term* insurance.

Problems. 1. If a young man takes out a $5000 twenty-payment policy at $27.40 *per $1000,* how much will he have paid when the policy matures?

Solution:

1 premium = 5 × $27.40 = $137.00
20 premiums = 20 × $137 = $2740

When the policy matures he will have paid in, in premiums, $2740.

2. A man pays $73.80 annually on a $3000 policy. What is the rate of premium per $1000?

$$\text{Rate per } \$1000 = \frac{\$73.80}{3} = \$24.60$$

A singer may insure himself against loss of income by injury to his voice; the musician against loss due to injured wrist or finger; the dancer may fortify herself against similar loss through injured foot or toe, and so on. But these situations present nothing new in mathematics. A.H.

INTAGLIO, *in tal'yo,* a form of engraving by means of figures or lines hollowed below the surface. The term is also descriptive of the objects thus engraved, such as signet rings, dies and copperplates. This process is opposed to that employed in making a cameo, the design of which rises above the background, called *relief.* In an industrial sense, the term is applied to a hollowed design intended as a mold for the reproduction of the figures or lines. See GEMS.

INTELLIGENCE, *in tel'i jens,* THE MEASUREMENT OF. Perhaps the most important psychological advance of the last quarter century has come from the development of exact methods of measuring intelligence.

Although many systems of mental measurement have been devised, all are based upon essentially the same principle; namely, the use of standardized tests. More than a half century ago Francis Galton suggested the possibility of "obtaining a general knowledge of the capacities of a man by sinking shafts, as it were, at a few critical points." The idea Galton had in mind was essentially the test method, and it was apparently suggested to him by methods employed in the testing of mineral ores.

With the development of experimental psychology during the last quarter of the nineteenth century, numerous attempts were made to measure mental capacities by the test method. Although the results of these earlier investigations were not altogether unsuccessful, the methods employed fell short of the desired accuracy and were clumsy to apply. It was not until 1908 that the first usable system for measuring intelligence was given to the world. This was the now famous Binet-Simon Intelligence Scale, devised by the French psychologist, Alfred Binet, and his physician-colleague, Th. Simon. The Binet-Simon system has so many advantages, both in accuracy and in ease of application, that it has practically superseded all other methods, and is now in constant use in hundreds of public schools, institutions for the feeble-minded, in juvenile courts, reform schools and prisons.

The Nature of the Binet-Simon Method. The Binet-Simon scale is made up of an extended series of tests in the nature of "stunts," or problems, success in which demands the exercise of intelligence. By trying out many different tests in this way, Binet and Simon secured a scale of fifty-four tests ranging from the three-year level to adult intelligence.

The tests were arranged in order of difficulty as found by trying them upon several hundred normal children of different ages from three to fifteen years. It was found, for illustration, that a certain test was passed by only a very small proportion of the younger children, but that the per cent passing increased rapidly in the succeeding years until finally practically all the children were successful. If, for example, the test was passed by about two-thirds to three-fourths of the normal children seven years of age, it was considered a test of seven-year intelligence; one passed by 65 to 75 per cent of the normal nine-year-olds was considered a test of nine-year intelligence, and so on.

Examples of Tests Used. The scale contains a great variety of tests. Memory, for example, is tested by the repetition of sentences ranging from three to twenty-six syllables in length, and by the repetition of digit series ranging from two to seven digits each. There are several tests of "time orientation," including distinction between forenoon and afternoon, naming the days of the week and the months of the year, and giving the date. Eye-hand coördination is tested by drawing geometrical figures from copy; wealth of ideas, by naming as many words as possible in a given time; perception, by defining words and by the description and interpretation of pictures; logical association, by the detection of nonsense in such statements as "I have three brothers—Paul, Ernest, and myself;" resourcefulness, by questions asking what one ought to do under given circumstances, as, for example, if one's house is afire, if one is going some place and misses the train, etc. There are also tests of language comprehension, of knowledge about common objects, of ability to comprehend and use abstract ideas, and of other intellectual powers.

How the Scale is Used. In using the scale it is only necessary to begin the examination of the subject at a point where all the tests are passed, and to continue up the scale until no more successes are possible. We then compare the subject's performance with the standard for normal children of the same age and note the amount of retardation or advancement. If a subject goes as far in the tests as normal nine-year-old children ordinarily go, we can say that he has a "mental age" of nine years. If he can go only as far as the average eight-year-old child we say that his "mental age" is eight years. In like manner, a mentally defective adult may have a "mental age" of only five years, or a young genius of nine years may have a "mental age" of twelve or fourteen years.

It was chiefly the utilization of age standards that gave the Binet-Simon method its great advantage over other systems of tests. The principle has come to be known as the "age-grade method."

Improvements of the Binet-Simon System. As left by the authors, the scale was far from perfect. It was especially unsatisfactory in the upper and lower ranges, yielding mental ages considerably too high at the lower end and considerably too low at the upper end. Revisions and adaptations of the scale designed to eliminate these imperfections have been made in nearly all the leading countries. The American revisions most in use are those of Goddard, Kuhlmann and Terman. The last, known as the Stanford Revision, is based on tests of more than 2,300 subjects of all ages. Besides correcting the location of the tests used by Binet and Simon, it has increased the number of tests from fifty-four to ninety and has defined the procedure in such detail as to make the scale serviceable to teachers, physicians and others who have had little psychological training.

The "Intelligence Quotient." One of the most important advances has come from the discovery that in the mental development of a given child the mental age maintains a fairly constant ratio to the actual age. It has been found, for example, that the five-year-old of four-year intelligence (20 per cent retarded) will at the age of ten years have approximately eight-year intelligence (still 20 per cent retarded). The same holds for children whose mental age is in advance of the real age.

This discovery has given rise to the use of the "intelligence quotient" (usually called the IQ). By IQ, therefore, we mean simply the ratio of mental age to real age. The ten-year-old of five-year intelligence has an IQ of 50; the ten-year-old of twelve-year intelligence, an IQ of 120; the twelve-year-old of nine-year intelligence, an IQ of 75; the six-year-old of nine-year intelligence, an IQ of 150, etc.

In calculating the IQ of adult subjects we disregard the years of real age above sixteen, since it has been found that native mental ability improves little beyond that age. The twenty-year-old of twelve-year intelligence, for example, has an IQ of 75 ($12 \div 16 = 75$).

The Significance of Various Intelligence Quotients. The highest-grade cases which find their way into institutions for the feeble-minded rarely test above 75 IQ. Anyone who tests as low as 70 IQ may safely be classified as feeble-minded. Those between 70 and 80 IQ may be called border-line cases. They are far from normal, and yet under favorable circumstances they may be able to take their place after a fashion in the social and industrial world.

Tests of unselected school children show that about 1 per cent fall as low as 70 IQ, 2 per cent as low as 75 IQ, and 5 or 6 per cent as low as 80 IQ. On the other hand, the number of dull children is equaled by the number having superior intelligence, and those having

extraordinarily superior intelligence are about as numerous as the feeble-minded.

Occasionally a child is found who tests as high as 150 or even 160 IQ. An idea of what such intelligence can accomplish is illustrated by the following cases which have come under the observation of the writer (Terman): (1) Girl, aged seven and a half years, IQ 140, carrying fifth grade school work with marks 95 to 100; (2) Boy, aged eight and a half years, IQ 150, leading his class in the sixth grade; (3) Boy, aged ten years, IQ 140, doing excellent work in the seventh grade.

On the other hand, children of 75 IQ are never capable of doing satisfactory work in the grade where they belong by real age. After they have been in school five or six years such children are usually doing very inferior work in a grade from two to four years below where they belong by age. Children of 95 to 105 IQ practically always make normal progress unless prevented by illness or lack of opportunity. Those testing around 85 IQ are merely dull; they cannot be classified as feeble-minded, but they are rarely capable of making the eight grades in eight years.

The Uses of Intelligence Tests. The value of the test method lies both in its accuracy and its convenience. By its use the child of exceptional mentality, whether feeble-minded or genius, is quickly identified and the exact grade of his ability determined. The test is made in less than an hour and gives a more accurate idea of a subject's intelligence than would be possible on the basis of years of ordinary observation. What a child will be able to accomplish in his school work can be forecast with a high degree of accuracy by means of a test given when he enters school at the age of six years.

Largely because of the lack of intelligence tests the majority of high-grade feeble-minded and border-line cases were formerly but rarely identified. Such individuals may be perfectly normal in appearance and yet have the mental traits of average children of nine or ten years. Their mental resources are scanty, they are weak in such powers as reasoning and judgment, they have little foresight or prudence, and they are correspondingly weak in social and moral responsibility. They cannot compete on equal terms with their fellows, cannot secure or hold good positions, and therefore easily become vagabonds, paupers, or criminals.

Many investigations in which the tests have been applied in juvenile courts, reform schools and prisons prove that at least one-fourth of the offenders who come before the courts are feeble-minded and that almost as many more are little above the border-line level. Of 400 juvenile delinquents, examined by one of the writer's students, about 120, or 30 per cent, tested below 75 IQ. Since the cost of crime in the United States is conservatively reckoned at $500,000,000 per year, it is evident that psychology has found here one of its most fruitful applications.

Tests of vagrants and unemployed have given results hardly less startling. Of 150 "hoboes" tested under the direction of the writer, one-fifth were found to be definitely feeble-minded and another fifth were border-line cases. Tests made by others have given results in substantial agreement with these. By the use of intelligence tests tens of thousands of feeble-minded persons now at large will ultimately be brought under the care of the state.

Intelligence tests have many other applications. Thus the vexed question as to the relative intelligence of the various races of mankind will have to be answered by the test method. Investigations have already been made which indicate that negroes, the American Indians, and the Mexicans are significantly inferior in mental ability to the average whites of the United States.

Similar comparisons of the IQ's of boys and girls have failed to show any very significant sex differences in intelligence, although girls have been found to average slightly better than the boys, age for age. L.M.T.

Consult Stern's *The Psychological Methods of Measuring Intelligence;* Terman's *The Binet-Simon Intelligence Scale; Including a Complete Guide for the Use of the Stanford Revision and Extension.*

INTEN'SIVE FARMING. According to the United States Department of Agriculture, "the man who makes every part of his land produce, either directly or indirectly, is an intensive farmer, if he makes it produce to its utmost in quantity and quality." In Europe most of the farms are small, and the density of population compels intensive farming. Consequently, every square rod of tillable land is under cultivation, and the farmers keep their soil in such a high state of fertility that, notwithstanding the thousands of years of cultivation, the production per acre increases from year to year. All waste that can possibly be used for fertilizer is saved, and to this are added green-

manure crops and commercial fertilizer. By these means the fertility of the soil is constantly increased and the European farmer obtains a yield from one-third to one-half larger than the American farmer.

In America land has been plentiful and cheap, and the farmer has tilled large farms, doing as little as possible, and leaving nature to do as much as possible. Wasteful methods of farming have been the rule. Now that land is becoming more valuable it is necessary for the farmer to resort to more thorough and scientific methods of tillage. The following lines of agriculture are especially adapted to intensive farming.

Dairying. Many farmers do not know whether they are keeping cows at a profit or a loss, simply because they keep no record of the milk and butter fat produced by each cow. An intelligent study of the herd will lead to an improvement that will greatly increase the dairyman's profit. The Agricultural College of Illinois estimates that the scientific management of a dairy herd, including the raising and harvesting of the crop and proper feeding, will increase the present profit in milk production fivefold.

Fruit Growing. The application of intensive farming to fruit growing is well illustrated in the raising of apples. The fruit grower aims to secure the largest possible quantity of salable fruit. This necessitates careful attention to the orchard, and the wise use of cover crops. Pruning, spraying and tillage are all necessary to a good crop. These suggestions apply with equal form to the raising of peaches, pears, plums, grapes and small fruits.

Truck Farming. All truck farming is necessarily intensive; success depends upon a fertile soil, constant and thorough tillage and a wise use of fertilizer. Such crops as onions, tomatoes, lettuce, cabbage and cauliflower, usually yield a profit of several hundred dollars per acre when they are properly cared for.

Irrigated Land. All land under irrigation is farmed intensively. The crops in the irrigated districts usually consist of fruit, vegetables and alfalfa. Since the water obtainable can irrigate only small areas, the farmer must realize the largest possible profit from his land, therefore, the farms are small and under a high state of cultivation.

Possibilities. The best farm lands in the United States and Canada are not excelled by those of any other country, yet their average production is scarcely more than one-half of what it might be under intensive farming. The tendency now is to meet new conditions by breaking up the large farms and ranches into small farms which will be more thoroughly and intelligently cultivated. W.F.R.

INTEREST (In Business). Interest is money paid for the use of money. We pay *rent* for the *use* of another's farm, garage, house, etc., we pay *hire* for the *use* of another's horse, etc., and we pay *interest* for the *use* of another's money.

Interest is expressed as a per cent of the sum of money borrowed. The sum borrowed is called the *principal;* the per cent paid is called the *rate*. The rate named is for the use of the principal for one year; for example, when we say that a man borrows $7,000 for 4 years at 6%, we mean that he must pay *each year* as interest 6% of $7000, or $420. Interest is paid very often *semiannually;* at times *quarterly*, and at times *yearly*. At the present time, the *semiannual* payment is common.

Problems. 1. Mr. Green borrows $1500, January 2, 1917, for 5 years at 6%, interest payable semiannually. What is the semiannual interest? When is the first interest due?

Solution:

Prin. = $1500
Rate = 6%
Semiannual Int. = .03 × $1500 = $45.
First interest is due June 2, 1917.

2. Mrs. Mallon borrows $1750 at 5½% for 3 years, interest payable annually. What is each interest? What is the interest for the entire time?

Solution:

Prin. = $1750
Rate = 5½%
Time = 3 yr.
Annual Int. = .05½ × $1750 = $96.25
Entire Int. = 3 × $96.25 = $288.75

3. What is the interest paid for the use of $75,000 for 8 years at 4½%?

Solution:

Prin. = $75,000
Rate = 4½%.
Time = 8 yr.
Int. = 8 × .04½ × $75,000
Int. = .36 × $75,000 = $27,000

Methods of Computing Interest. (a) *The Direct Method.* When the principle involved is clear, this method will be popular:

Find the interest on $360 for 2 yr. 5 mo. 20 da. at 6%.

5 mo. 20 da. $= \frac{5\frac{2}{3}}{12}$ yr. $= 1\frac{7}{36}$ yr.
Prin. = $360
Rate = 6%
Time = 2 yr. 5 mo. 20 da.
Int. $= 2\frac{17}{36} \times .06 \times \$360$
Int. $= .14\frac{7}{18} \times \$360 = \$53.40$

To use this method, we must learn to tell readily what part of a year any number of months and days are.

7 mo. 12 da. $=\frac{7\frac{2}{6}}{12}$ yr. $=\frac{87}{60}$ yr.

4 mo. 10 da. $=\frac{4\frac{1}{6}}{12}$ yr. $=\frac{13}{36}$ yr.

6 mo. 6 da. $=\frac{6\frac{1}{6}}{12}$ yr. $=\frac{31}{60}$ yr.

8 mo. 20 da. $=\frac{8\frac{2}{6}}{12}$ yr. $=\frac{15}{18}$ yr.

Find the interest on $12,800 for 8 mo. 20 da. at 4½%.

Prin. = $12,800
Rate = 4½%
Time = 8 mo. 20 da.
Int. $=\frac{15}{18}\times.04\frac{1}{2}\times\$12,800$
Int. $=.03\frac{1}{4}\times\$12,800=\$416.$

(*b*) *The 6% Method.* The interest for one year on any principal at 6% is .06 of the principal; for *one month* it is (1/12 of .06 or .005) of the principal; for *six days* it is (1/6 of .005 or .001) of the principal; for *one day* it is (1/6 of .001 or .000⅙) of the principal.

Put into more concise form, we have:

Int. for 1 yr. = .06 of Prin.
Int. for 1 mo. = .005 of Prin.
Int. for 6 da. = .001 of Prin.
Int. for 1 da. = .000⅙ of Prin.

Using this method, find the interest on $1600 for 3 yr. 4 mo. 24 da. (1) at 6%. (2) At 7½%. (3) At 5½%.

Solution:

(1) Prin. = $1600
Rate = 6%
Time = 3 yr. 4 mo. 24 da.
Int. = (.18 + .02 + .004) × $1600
Int. = .204 × $1600 = $326.40

(2) Interest at 6% is $326.40; interest at 7½% is $\frac{1\frac{1}{2}}{6}$ or ¼ *greater.*

Solution:

Int. at 6 % = $326.40
Int. at 1½% = 81.60 (¼ of $326.40)
Int. at 7½% = 408.00

(3) Interest at 5½% is $\frac{\frac{1}{2}}{6}$ or 1/12 *less* than at 6%.

Solution:

Int. at 6 % = $326.40
Int. at ½% = 27.20 (1/12 of $326.40)
Int. at 5½% = 299.20

(*c*) *The Thousand-Day Method.* This is a clear, simple method which should be more widely known. It lends itself to any interest problem. It is based upon the fact that *any principal put on simple interest at 36% will double itself in 1000 days;* for example, the interest on $800 at 36% for 1000 days is $\frac{1000}{1000}\times\frac{1}{1}\times\$800=\$800.00$, or the interest is equal to the principal.

(1) Find the interest on $500 at 6% for 2 yr. 6 mo. 18 da.

Solution:

The interest at 36% for 1000 days is $500.
2 yr. 6 mo. 18 da. = 918 da. or $\frac{918}{1000}$ of 1000 days.

Int. for 1000 da. at 36% = $500
Int. for 918 da. at 36% = $\frac{918}{1000}\times\$500$

$$\frac{918\times\$500}{1000}=\$459.000$$

Int. for 918 da. at 6% = $\frac{\$459}{6}=\$76.50$

From the above may be seen the rule called the "1000 day rule": Multiply the principal by the number of days, and point off three decimal places, that is, divide by 1000, and the result is the interest for the given time at 36%. Then from this result find it for 6% by taking ⅙ of the result; at 4% by taking ⅓ of the result; at 3% by taking 1/12 of the result; at 4½% by taking ⅛ of the result, and so on.

To Find Rate. At what rate will $16,500 yield $1,815 interest in 2 yr.?

Solution:

Int. for 1 yr. $=\frac{\$1815}{2}=\$907.50$

Rate $=\frac{907.50}{16500}=.05\frac{1}{2}$

(Rate means the part one year's interest is of the principal.)

To Find Principal. What principal at 5½% will yield $907.50 interest in 4 years?

Solution:

Int. for 4 yrs. = (4 × .05½ or .22) of Prin.
$907.50 = .22 × Prin.
Prin. $=\frac{\$907.50}{.22}=\$4125$

To Find Time. In what time will $450 give $68.40 interest at 6%?

Int. for 1 yr. = .06 × $450 = $27.00

Number of yrs. $=\frac{\$68.40}{\$27.00}=2\frac{6}{15}$

$\frac{6}{15}$ yr. $=\frac{6}{15}\times\frac{12}{5}$ mo. $=6\frac{2}{5}$ mo.

Time = 2 yr. 6 mo. 18 da. A.H.

INTEREST (In Economics). When a person does not spend all he earns, he accumulates money which is called *capital.* This capital can be very useful in developing new industries or in aiding people temporarily in need of financial help. Because the man saving money has denied himself what his money could give him and because he helps others to produce, he is entitled to a certain financial return from his loans. This return or premium is called *interest,* from the Latin *interesse,* meaning *to influence.*

Economic View. In the study of economics three views or theories of interest are the most prominent; these are abstinence, productivity and exploitation. The *abstinence theory* holds that the lender earns his interest for abstaining from spending the money in an unproductive way. The *productivity view* points out that in producing anything, money or capital is as necessary as labor, and therefore deserves a sort of wages known as interest. The *exploitation theory,* very popular among Socialists and various organizations, declares labor the only source of wealth, and interest simply a tax collected by capitalists because they have the power to stop industries by not circulating their money. It should be remembered that in business when a man possessing capital invests it in an industry he practically lends it to that enterprise, even if he himself owns and manages the factory or shop. Such

a man should add the interest on his capital to the expense account of his business before calculating his profit.

Interest, like nearly anything else, varies according to the money supply and demand. If there are large opportunities to make money by producing some commodity, there is, of course, an increased desire to borrow, and the rate of interest will be high while the unusual demand continues; when money is not urgently needed the rate begins to fall.

Legal Interest Rates. The rates of interest lawful in the United States are given here:

STATE	LEGAL RATE	BY CONTRACT
Alabama	8	8
Alaska	8	12
Arkansas	6	10
Arizona	6	12
California	7	Any
Colorado	8	Any
Connecticut	6	6
Delaware	6	6
Dist. of Columbia	6	10
Florida	8	10
Georgia	7	8
Idaho	7	12
Illinois	5	7
Indiana	6	8
Iowa	6	8
Kansas	6	10
Kentucky	6	6
Louisiana	5	8
Maine	6	Any
Maryland	6	6
Massachusetts	6	Any
Michigan	5	7
Minnesota	7	10
Mississippi	6	8
Missouri	6	8
Montana	8	Any
Nebraska	7	10
Nevada	7	Any
New Hampshire	6	6
New Jersey	6	6
New Mexico	6	12
New York	6	6
North Carolina	6	6
North Dakota	7	12
Ohio	6	8
Oklahoma	6	10
Oregon	6	10
Pennsylvania	6	6
Rhode Island	6	Any
South Carolina	7	8
South Dakota	7	12
Tennessee	6	6
Texas	6	10
Utah	8	12
Vermont	6	6
Virginia	6	6
Washington	6	12
West Virginia	6	6
Wisconsin	6	10
Wyoming	8	12

In Canada. The legal rate of interest throughout Canada is established at five per cent, but any higher rate may be stipulated by agreement between contracting parties. However, by terms of a law affecting professional money lenders, no rate may exceed twelve per cent on a loan of $500 or less.

INTEREST (IN PSYCHOLOGY). Children on a playground engage in different sorts of play. Some are swinging, others are climbing poles and others playing ball. When permitted to choose their subjects high school students indicate their individual likes and dislikes in the selection of their studies. John may choose a course in agriculture and Henry one that will lead to a professional career. Mary may choose household arts and Helen may select such studies as will prepare her to become a teacher. What is the cause of these different choices? The answer is that each chooses that which most strongly appeals to him, that in which he finds the highest satisfaction. In other words, each chooses the line of work in which he is the most deeply interested.

Interest is the value in ideas; we are interested in whatever satisfies our physical, intellectual and spiritual wants. The child's first interest is in whatever ministers to his physical needs, such as food, clothing, shelter. His next interests are in those things that satisfy his mental needs, such as the mother's soothing care, the bright toy and the daily play with some one who can give him the exercise his system craves. His interests are both pleasurable and painful. He derives pleasure from his cup of milk and eagerly looks for the next cup when the time for it arrives. But after he has burned his hand on a hot stove he is interested in avoiding it.

Interest is a feeling, and like any other feeling it is individual. The same object will arouse interest in some and aversion in others, and still others will look upon it with indifference. Interest is one of the strong characteristics of personality, and while many people may have similar interests, the interests of no two persons are identical.

Interest is immediate and remote—immediate when it is placed on something that satisfies present needs, like food when one is hungry, and a game of ball when one desires physical exercise. It is remote when fixed upon something to be attained in the distant future, such as entering upon a profession for which years of preparation are necessary, or the acquisition of wealth as the result of a long business career.

When the remote interest is determined it becomes the guiding motive of one's life, and all the immediate interests are subservient to it.

Interest and attention are inseparable. We attend only to that which interests us. Interest is also affected by knowledge. The child takes no interest in those objects which have no significance to him. New ideas must bear some relation which he can recognize to those already in his mind before his interest in them can be awakened. But when the new idea is thus related the new and the old blend and strengthen each other and the interest in both is increased. It is by this development of interest through the association of ideas that one's store of knowledge is acquired. Prof. William James gives the following rule for securing and retaining interest:

> An object not interesting in itself may become interesting through becoming associated with an object in which interest already exists. The two associated objects grow, as it were, together: the interesting portion sheds its quality over the whole; and thus things not interesting in their own right borrow an interest which becomes as real and as strong as that of any natively interesting thing.

Another important principle is that action lends interest. A crowd will watch a moving sign when one without motion attracts little or no attention. The teacher who is active, who can make scissors and crayon talk, will hold the interest of her pupils. Vocational training prolongs school attendance because the opportunity to do things holds the pupil's interest in his work.

A third principle is that the more senses the child can use in obtaining a knowledge of an object, the greater his interest in it. If he can touch it, smell it, taste it as well as look at it, his interest will last until he has experienced each new sensation. Illustrations increase the interest in a book because they enable the reader to gain at a glance a comprehensive idea of the subject. Teachers and parents who understand this principle supply their children with books having good illustrations.

Interest lies at the foundation of all our studies and should lie at the foundation of our occupation. Work in which we take no interest is the merest drudgery, and that young person who discovers that he has entered upon an occupation for which he is acquiring a growing dislike should make a change before it is too late. W.F.R.

Consult DeGarmo's *Interest and Education.*

Related Subjects. The reader is urged to refer to the following articles in these volumes in the order named: ATTENTION; APPERCEPTION; ASSOCIATION, LAW OF.

INTERIOR, DEPARTMENT OF THE, the seventh division of the Executive Department of the United States, in order of organization. It was created in 1849 by "An Act to Establish the Home Department," and was the first of the new departments demanded as the result of growth and expansion of the United States. At its head was placed the Secretary of the Interior, and he became a member of the President's Cabinet.

Its organization was perfected by transferring from the Department of State the Patent Office and Copyright Bureau and the Census Bureau; from the Treasury Department the Land Office (see LANDS, PUBLIC); from the War Department the Bureau of Indian Affairs; and jointly from the departments of War and the Navy the Pension Bureau; the custody of certain public buildings was transferred from the care of the President to the new department. Besides the above the department was given charge of the Geological Survey, the Bureau of Mines and the increasingly important Reclamation Service. In 1868 the Bureau of Education, which had existed for a year without being definitely assigned its permanent place, was attached to the Department of the Interior. In 1912 the Bureau of Child Welfare was organized and made a branch of this Department. When the Department of Commerce and Labor was organized, in 1903, the Bureau of the Census was transferred to it from the Department of the Interior.

The Secretary of the Interior is appointed by the President, with the approval of the Senate, and receives a salary of $12,000 per year. Two assistant secretaries with salaries of $5,000 and $4,500, respectively, receive appointment in like manner. The heads of the various bureaus within the Department are appointed by the President and the Secretary of the Interior, subject to confirmation by the Senate, and are under the direct control of the Secretary. See CABINET. E.D.F.

INTERIOR DECORATION. When Robinson Crusoe, shipwrecked and desolate, found himself upon the shores of an unknown island, his first thought was to find some kind of shelter. He feared attacks from wild beasts, and possibly from wild and savage men, and he needed protection from the weather. The story of his experiences in digging his cave, in

building the great stockade, and finally in constructing his tree house, will be read by boys and girls with great delight as long as books are read at all.

We may wonder if Crusoe tried to decorate his house in any way. We think he did, for the instinct for a beautiful home is present in everyone. The cave men and the cliff dwellers drew pictures on the walls and roofs of their dwellings, and these we have discovered after thousands of years. The Indians covered their tepees with shapes and figures and all kinds of symbols, using the brightest colors they could obtain. The dugout of the herder on the plains and the rough shack of the miner are sure to show some bit of decoration. Perhaps it is only a gaudy picture from a playbill or the bright cover from a magazine; but whatever it is, it has been put there by some one to satisfy his love of beauty.

When you were little you surely spent many hours at "playing house." Perhaps you had out door plans in a corner of the yard or playground, using bits of broken china or bright pebbles, laid in rows to separate one room from another. Or you might have found a packing case or a soap box in the back of woodshed, and furnished it with paper tables, chairs and cupboards. There are many ways of playing house, and all of them are interesting. Some people never tire of it, and keep on making tiny rooms and houses, using paper and cardboard to build with, and expressing with these materials some very artistic ideas. Working out problems in house furnishing and using only paper cardboard and water colors, or colored crayons, is a fine way to train one's taste and judgment in this direction. Even though we may never build an actual house, we can experience the pleasure of building and furnishing these houses of cardboard and paper.

The first figure in the color plate shows a model of a kitchen. The walls are of cardboard, and the curtains have been fashioned together with strips of thin muslin, so the little room may be moved flat and put away when not in use. The floor is not attached to the walls but is cut large enough to extend beneath them, forming a sort of platform, on which the walls may stand.

The color scheme in the kitchen has been a very simple matter to arrange. [illegible] were the most important [illegible] in the house as indeed [illegible] is the housekeeper's workshop and it is [illegible] the best of the family time spent there

day. The kitchen, [illegible]re, should be bright and c[illegible]ty an and sanitary, and full of labor-savi[illegible] devices. The planning of a design for a clean, comfortable and beautiful kitchen is a most interesting problem.

In the working out of these problems in decoration, a good supply of colored papers, in a variety of tones, is necessary. There should be tones of brown and gray, together with black and white for the woodwork. Greens, blues, grays, oranges and blue

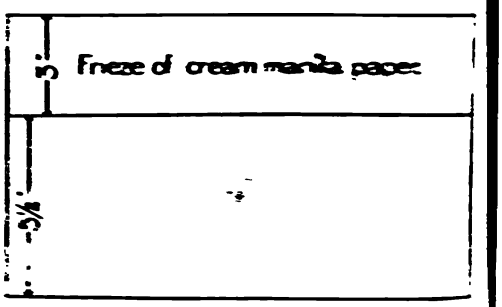


FIG. 1
First step in preparing back wall.

are essential for rugs. Delicate tones of all colors will be needed for wall spaces. Fancy papers will be found useful for hangings, pillow covers, etc. These manufactured colored papers supply a fine color quality that cannot be produced with water colors or with colored crayons.

In the second figure in the color plate is shown a model for a dining living room. The color scheme is blue and white, with touches

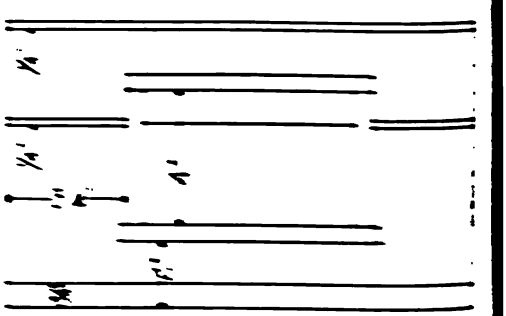
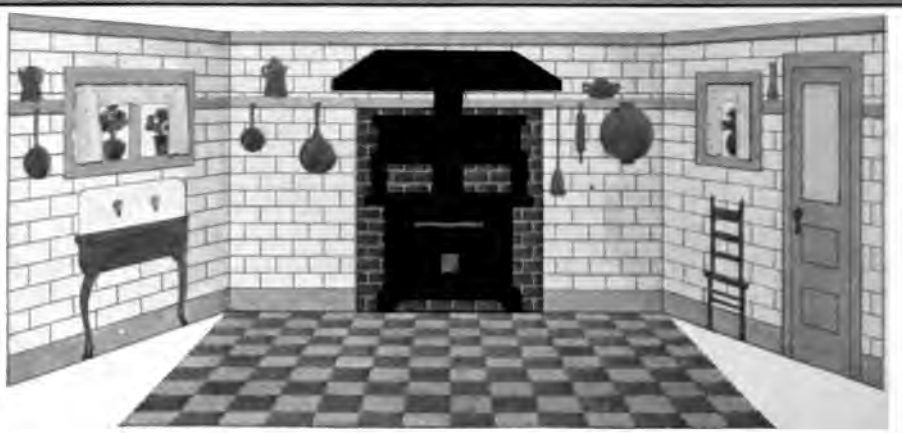
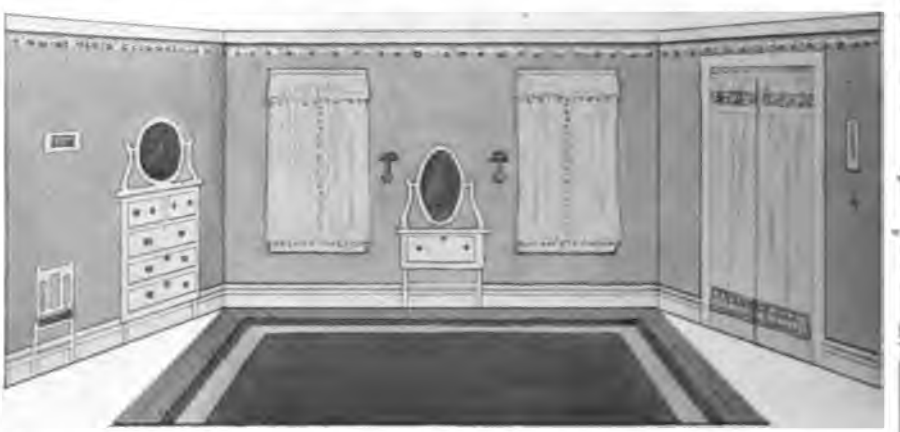


FIG. 2
Second step in preparing back wall.

of brilliant orange. The floor is covered with a rug in two tones of blue. The walls are light blue, with a pattern in orange, and the woodwork is [illegible] enamel, outlined at these points [illegible] ribbon that might well be another [illegible] orange, matched by a [illegible]

PRACTICE WORK IN HOME DECORATION





KATE ABELMANN

s follow, step by step, the construction lapsible model for a dining room, the ure in the color plate. First prepare lboards for floor and walls. Cut one ½"x14", for the back wall (Fig. 2). Cut ces for the end walls, each 8½"x9½". iece for the floor 11½"x16".

corating our dining room we will work wall at a time. Let us begin with the ll, which is the largest and most impor- ce. The first thing to decide upon is r scheme. A general scheme of orange ie will be appropriate and effective.

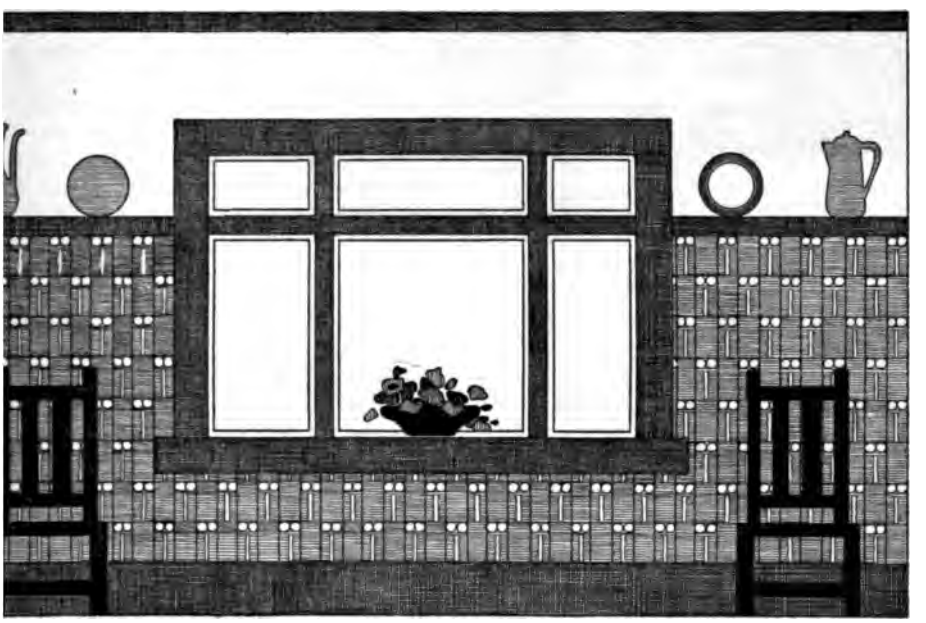


FIG. 3. DINING ROOM

s not mean that we shall select bright for woodwork or wall paper. Cream uff, light-brown and dark-brown are of orange. We know the great variety of blue.

3"x14" strip of cream manila paper eze. Paste it at the top of the back Cut a 5½"x14" strip of light-brown id paste it below the frieze, to cover (Scraps of small-figured or delicately wall paper could be used, if desired.) eral half-inch strips of warm-brown r the trim.

next plan the dimensions and placing window frame. Cut from one of the strips a piece 7¼" long. Paste this om the bottom and 3¼" in from the of the wall, forming the window sill. Cut two pieces, each 4" long, for the uprights. Paste these in place, so a slight projection of the sill is seen at each end, as shown in Fig. 2. Cut a 7" length for the top of the frame, and paste it in position.

The window frame is subdivided into interesting proportions by pasting quarter-inch strips vertically and horizontally within the frame, as shown in Fig. 3. Rectangles of pale blue paper (to represent window panes) are cut and pasted within these openings (see, also, color plate). Cut from the warm-brown paper a strip ¾"x14". Paste this at the bottom of the wall for a baseboard. Cut strips of warm-brown paper ¼" wide, for picture molding and plate rail. Paste these in position, as shown in Fig. 2. The wall is now ready for the furniture, and for such decorations as we may wish to add.

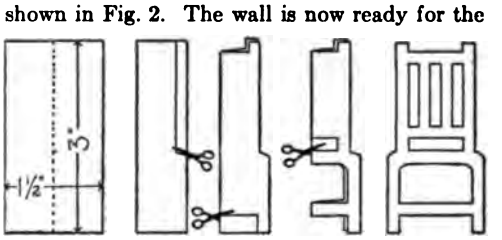


FIG. 4
Steps in cutting shape of chair.

The two chair shapes shown in Fig. 3 are cut from dark-brown paper, following the steps

shown in Fig. 4. They are pasted against the wall, on either side of the window, giving a balanced effect.

The bowl of nasturtiums in the window plays no small part in our color scheme. Dark-blue

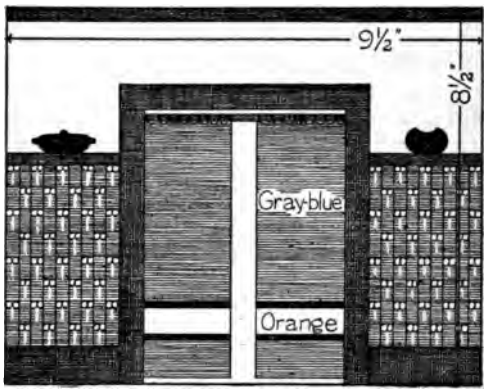


FIG. 5
Right wall of dining room.

paper was chosen for the bowl, and bright-orange tones for the flower shapes. Leaf shapes were cut from green paper. The decorative pottery shapes pasted above the plate rail were cut from orange, blue and white papers.

The steps in arranging the left and right walls are shown in Figs. 5 and 6. Of course,

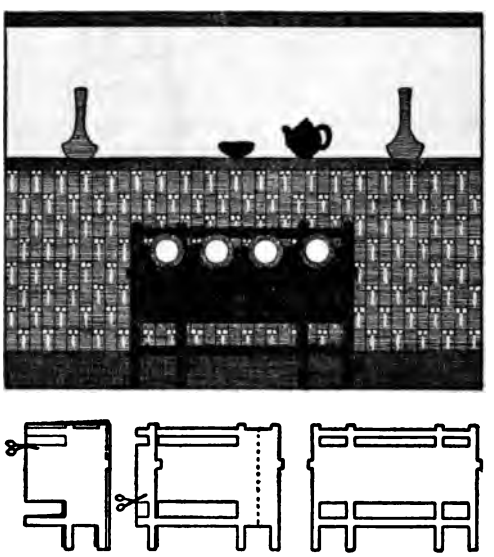


FIG. 6
Left wall of dining room, and steps necessary in cutting shape of sideboard.

the same colored papers are used on these walls as in the arrangement of the back wall. In the right wall the hangings were cut from medium-blue paper. When the three walls are finished they are joined together by strips of thin muslin, pasted to form hinges on the back.

The largest piece of cardboard is intended for the floor. It should be covered with the same brown paper that was used for baseboards and moldings. A simple rug design, consisting of panels of medium- and dark-blue paper, was pasted in the middle of the floor. The outside measurement of the rug was 7½" x12".

The completed model, set in position, is shown in Fig. 3 and in the color plate. B.S.

INTERJECTION, *in ter jek' shun.* The name *interjection* largely explains the nature of this part of speech, for it is derived from two Latin words meaning *thrown in between.* The interjection is an exclamation—expressing surprise, pain, or some other sudden or intense feeling—thrown into the sentence as an independent element. It bears no grammatical relation to the other words and is not needed to complete the sense. Therefore it does no work, grammatically speaking; yet, rightly used, it strikes the emotional keynote of the sentence. Because of this characteristic it has been likened to a small boy sitting on the fence at a baseball game and exclaiming delightedly or disgustedly, as the case may be, over the playing of the team.

Among interjections are included both special words which have no other use, such as *alas!* and words belonging to other parts of speech when used in an exclamatory sense.

Derived Interjections. Almost any word belonging to any part of speech may serve as an interjection, the voice or the punctuation making it exclamatory. The following sentences are given in illustration: Noun—"*Bugles!* and the great nation thrills and leaps to arms!" Pronoun—"*He!* What can he do unaided?" Verb—"*Hark! Hark!* the lark at heaven's gate sings." Adjective—"*Enough!* I will not play the Seer." Adverb—"*Quickly!* catch hold of the rope!" Conjunction—"*But!* I recognise no 'buts.'"

O and Oh. While the line is not now sharply drawn between these two forms of the interjection, *O* is generally used in expressions of wishing and always in direct address. In Hamlin Garland's poem, *In the Grass,* the interjection in one verse introduces a wish:

> O to lie in long grasses!
> O to dream of the plain!

and in a later verse is used as the interjection of address:

O far-off plains of my west land!
O lands of winds and the free,
Swift deer—my mist-clad plain!

Oh has a wider and more common use, indicating various emotions, such as surprise, pain, grief, fear, horror or longing. Thus in Mark Antony's phrase, "Oh, what a fall was there, my countrymen!" the interjection expresses mingled horror and sorrow. L.M.B.

INTERLAKEN, *in ter lah' ken,* meaning *between the lakes,* is a village of Switzerland in the valley of the River Aar, between lakes Thun and Brienz. One of the most popular resorts of the Alps, it is usually the first point in the journey through the beautiful Swiss country, visited annually by from 30,000 to 50,000 tourists. The highway between the lakes is a continuous line of hotels and boarding houses; a former Augustinian monastery, founded in 1130, and now occupied by government offices, forms the nucleus of the village. Population, 1910, 3,750.

INTERMEZZO, *in ter med' zo,* a short, musical piece, generally of light, sparkling character, introduced between the acts of a serious opera or drama. Almost all the earlier Italian plays were relieved by intermezzi, many of these being at first merely simple songs. In 1733, through the influence of Pergolesi, an Italian composer, the intermezzo was with great success performed as a separate work in one act. Not until seventeen years later (1750) was it introduced in this form into England. The intermezzo still holds a place upon the stage as an independent piece, although the dance has now displaced it somewhat. The *Entr'actes* composed by Beethoven for Schiller's *Egmont,* by Schubert for *Rosamunde,* and by Mendelssohn for Shakespeare's *Midsummer Night's Dream* are familiar to all music-lovers. The intermezzo played during the intermission in Mascagni's popular opera *Cavalleria Rusticana* is also a general favorite.

INTERNAL-COMBUSTION ENGINE. See GAS ENGINE.

INTER'NAL REV'ENUE, that part of the income of a government which is derived from taxes imposed upon commodities manufactured within the country, thus being distinguished from taxes upon imports, called tariffs, or foreign revenue. In the system of taxation employed in Canada, Great Britain, Australia and on the Continent these internal taxes are called *inland revenue,* or excise duties; the economic principle is the same in all countries, by whatever name the tax may be called.

Every government must raise money to defray its expenses, and the best means to employ is considered one of its most serious problems. The means by which revenue can be secured are few: (1) a direct tax may be levied upon every person, regardless of age or sex; this would be a very heavy burden, in the United States amounting to more than $12 per capita each year, or $60 for a family of five persons, while in Canada a like tax on each person would be $15; (2) a tax might be levied upon the property of individuals, which is the system employed in raising state and local revenue; (3) the entire sum might be raised by heavy duties on imports, but the burden might not be equitably distributed; (4) it might result wholly from taxes upon articles of domestic manufacture, but the same objection might be advanced.

The United States has levied direct taxes upon the people's property only three times, and then only as emergency measures—in 1798, 1812 and 1861. More than a billion and a half dollars are appropriated by each Congress to support the machinery of government, or at the rate of about $750,000,000 per year, and the required sum is constantly increasing. Of this vast amount about one-half is secured from foreign import taxes, about $250,000,000 from postal receipts, and the balance from taxes upon domestic manufactures.

When once it was determined to levy an internal revenue tax, there were differences of opinion as to the articles which should bear the burden—whether they should be selected from the lists of necessities or from luxuries only. The latter plan was determined upon, except when the nation faced extraordinary demands, and choice was limited as much as possible to those things which, through over-indulgence, may be called vices. Thus, liquors and tobacco in all their forms have been made to yield a revenue since the first excise bill was passed in 1791. The law of that year was very unpopular; the people were not prepared to accept the new economic measure, particularly in Pennsylvania, where, in 1794, the Whisky Insurrection occurred.

Every war the country has waged has made demands for immediately-increased revenues, and internal taxes have proved the quickest and surest source. They may be expanded at any given time to cover a great variety of articles. Therefore, when the wars of 1812, 1845, 1861 and 1898 necessitated larger revenues than were flowing into the Treasury, taxes were

placed upon bank stocks, checks, legal papers, matches, playing cards, licenses, gross receipts of railroads and insurance companies, and the like. With the passing of the emergencies, the tax was each time decreased by repeal of provisions applying to specified articles.

Alcoholic liquors and tobacco products have always produced the greater part of the revenue in every internal revenue law passed in the United States; at the present time oleomargarine, or butterine, adulterated butter, snuff, opium, playing cards, national bank circulating notes, net corporation profits above $5,000 per year, and personal incomes are also taxed (see INCOME TAX). The annual revenue from all these sources is about $350,000,000.

Internal revenue taxes have always been opposed to some extent by the people. They necessitate government interference with private affairs, in that manufacturers must make reports of their products and submit to inspection; they increase cost of manufacture, and in many cases demand employment of additional capital, and finally add to the price the consumer is obliged to pay. Nevertheless, with respect to the last contention, the proportion of each purchase which the tax represents is extremely small, and in times of peace usually the items taxed are such as one need not purchase unless he wishes to do so. It is certainly less of a financial burden than a direct cash annual contribution from each member of a family.

In the United States from 1801 until the second war for independence internal revenue taxes were abolished by the political party then in power, which was the forerunner of the present Democratic organization, on the ground that they were unnecessary to American institutions. But war necessities restored them, and since they have been recognized as a most important feature of the nation's financial policy.

Inland Revenue. In Great Britain the chief source of income for the support of the government is *inland revenue,* generally known as the excise, or excise duties. The excise in England dates from the Commonwealth, when the heavy expenses made necessary duties of every description. When the Royalists returned to power, however, the duties, instead of decreasing, continued to increase in number and amount. Excise duties from the first were levied on the manufacture of beer, ale, whisky and similar articles.

Popular feeling against these taxes ran high for many years, the definition of excise given in Samuel Johnson's dictionary being an expression of the prevailing sentiment: "A hateful tax levied upon commodities, and adjudged not by the common judges of property but wretches hired by those to whom excise is paid." Since Johnson's day the excise duties have been greatly lowered, their method of collection has been systematized and the burden has been equitably distributed. In certain sections the excise is still disliked, but it is recognized as a just means of revenue. There also remain in Great Britain certain excise licenses for the sale and manufacture of liquors, for other trades, such as auctioneers, pawnbrokers, etc., hunting licenses and licenses for carriages, automobiles and armorial bearings. The administration of these numerous taxes is in the hands of the Commissioners of Inland Revenue.

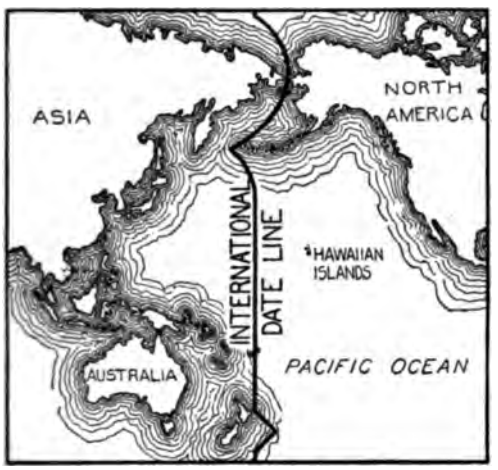
In most of the British colonies the excise duties are similar to those of the mother country. In Canada the Dominion government levies a tax on the manufacture of beer, whisky and tobacco, although prohibition is rapidly decreasing the revenue from liquor. The income from these three items is about $17,000,000 a year, or one-seventh of the total revenue of the Dominion. The collection of the excise is in the hands of the Dominion Department of Inland Revenue. In Australia the excise duties are levied by the Commonwealth and are administered by the Department of Trade and Customs. E.D.F.

INTERNATIONAL DATE LINE, an imaginary line, from pole to pole, extending from north to south, drawn, except for slight variations at the 180th meridian of longitude, or halfway around the world from the "given meridian" at Greenwich. It marks the place on the globe from which the beginning of each new day is reckoned.

If a person could leave New York at noon on Saturday and travel westward at a rate uniform with that of the sun, he would travel fifteen degrees in one hour, and at the end of twenty-four hours he would have circled the globe. According to local time wherever he happened to be, it would still be noon on Saturday, for everywhere he went the sun would continue to stand directly overhead; but according to the time in New York at the end of his journey, it would be noon on Sunday. Thus the traveler would have lost a day, because the earth, relative to his position, would have made no revolution. On the contrary, a traveler going eastward at the same rate would gain

a day, for the earth would have made two revolutions. If two people, starting from the same point, travel in opposite directions around the earth, their reckoning of time would differ by two days.

As confusion would be endless if the reckoning of time were unbroken around the earth, it was necessary to choose a point at which the date should change automatically. The meridian of 180° longitude was chosen for the reasons that it lies nearly in the middle of the Pacific Ocean, far from civilized countries, and



INTERNATIONAL DATE LINE

that it is exactly halfway around the world from Greenwich. The theoretical date line is therefore this 180th meridian, but in practice it is more convenient to deviate slightly from the meridian, to avoid the division of countries or islands. Thus the northeastern corner of Siberia, though nearly 15° east of the 180th meridian, lies west of the date line agreed upon. Similarly Samoa and part of the Aleutian Islands, though west of 180°, are east of the line. If the date line were drawn exactly north and south, local difficulties might arise—in some island the day might be Tuesday to one man and Monday with his neighbor; so the line is deflected wherever convenient.

The international date line has never been drawn by legal agreement among the nations, but general practice has determined its location.

INTERNATIONAL LAW, or the LAW OF NATIONS, is the general name applied to those rules which independent states observe or are expected to observe in their conduct toward one another. In other words, the law of nations is *that collection of usages which civilized nations have agreed to observe in their relations with each other.* International law deals with states, namely independent and sovereign states, just as municipal law deals with individuals. But there are several important differences between international and municipal laws. International law is not made by any legislative authority; it is not interpreted by any established judicial body; and, more than that, it cannot be enforced by a superior power. It is based, first of all, upon common conceptions of right and justice, and then upon a set of definite treaties and conventions concluded between the nations of the world. It contains a set of rules and customs which have no other binding force than the consent of those who obey it.

But the voluntary declaration of the states of their intention to comply with the rules, and the fact that any well-established rules are observed, show that international law does possess a binding character. The fact that states which break any of the accepted rules try to explain that their conduct is in accordance with international law also shows the binding character it has acquired.

Sources of International Law. International law is of recent origin and is the result of the growing spirit that principles of humanity ought to govern relations between the nations. Treaties and agreements between states are among the principal sources of international law. The usual method followed now is to hold conferences to which the various powers send delegates. The first of these conferences was held at Paris in 1856, and its decisions, called the *Declaration of Paris,* were the first step toward the codification of the rules of international law. This was followed by the Geneva Convention (which see), held in 1864. But the great work of putting into writing and codifying the rules that had been floating as unwritten law in the conscience of the civilized nations was undertaken by the two conferences held at the Hague in 1899 and 1907. The last great codification of international law was accomplished at the London Naval Conference held in 1909, which formulated the so-called *Declaration of London.*

General Aspects of International Law. International law deals with sovereign states. Each state has certain rights and duties, which are recognized by the other states, and the mutual recognition of these rights and duties forms the basis of international law. Among

the chief rights of a sovereign state are independence, equality with other states, determination of its own form of government, absolute and exclusive jurisdiction over its own territory and over its own resident citizens. One of the chief rights of sovereign states is the freedom of navigation on the high seas, which means that the high seas are free to the merchant and war vessels of all states. The sea which washes the coast of a state is, to the extent of three miles from shore, considered to be a part of the territory of that state. This forms what is known as the territorial waters.

Among the duties of a sovereign state are respect for the rights of other states; the maintenance of an orderly and efficient government; good faith in its dealings with other states and compliance with the generally accepted rules of international law. One of the oldest canons of international law is that relating to ambassadors and other representatives sent by one state to another. The persons of such representatives are held sacred and inviolable, and the same applies to their official residence and offices. Their families, official suite and their property also enjoy special privileges.

International Law in War. War profoundly modifies and changes the usual relations between the nations. The contending parties in war are known as *belligerents,* and other states are known as *neutrals.* Treaties existing between belligerents are usually abrogated or suspended during war, except as regards articles concerning the conduct of war. The possible areas over which operations are permissible are the territories of the belligerent states and the high seas.

War on Land. We give below some of the rules framed by the various international conferences for the conduct of warfare on land between civilized nations. Belligerents are forbidden to use poison or poison weapons; to kill or wound through treachery or after an enemy has laid down his arms and surrendered; to declare that no quarter will be given; to employ weapons, projectiles or substances of such a nature as to cause unnecessary pain; to make improper use of the flag of truce, national flag or the badge of the Red Cross (which see); to seize or destroy enemy's property except when actually necessary; to bombard undefended towns; to give up a city or place to pillage, sack or plunder, even if taken by assault; to bombard buildings devoted to the care of the sick or wounded, religious worship, art, science, charity and historical buildings and monuments, provided they are not used for military purposes.

Enemy's troops which surrender or are captured are prisoners of war. Prisoners of war must be treated humanely and must be given as good food, beds and clothing as are given the troops of the captor. The cost of keeping prisoners is to be repaid by their governments at the end of the war. Sick and wounded are to be cared for in accordance with the rules of the Geneva Convention.

In time of war there is occasionally intercourse between the belligerents, which should be held sacred. Such intercourse includes the interchange of prisoners, the temporary suspension of hostilities, the passage of flags of truce and the engaging in treaties of capitulation.

A war is terminated either by treaty or conquest. The latter must be complete before it is regarded as effective, and it must be accomplished by a proclamation of annexation, if territory is retained. After a conquest the conqueror succeeds to all the liabilities of the conquered.

War at Sea. The area in which naval operations may take place comprises the high seas and the territorial waters of the belligerents. The objects sought in naval warfare are the capture and destruction of the naval and military forces of the enemy, and of his sea-borne trade; and also the protection of the nautical territory and its sea-borne trade.

Below are given some of the rules which belligerents must observe in the prosecution of naval warfare. Most of them are found in the Declaration of London in 1909. Enemy warships may be captured outside of neutral waters, and the vessel is a prize of war, no prize court proceedings being necessary. Vessels owned by citizens of belligerent states are subject to capture as enemy property. Enemy's goods on an enemy's vessel are also subject to capture, but not enemy's goods on a neutral vessel. The United States has always striven to make it a rule of international law that private property not contraband of war (which see) be exempt from capture, but that rule has not been adopted. After a merchant vessel has been captured it must be brought before a prize court to determine whether it ought to be rightfully captured and condemned. Belligerent vessels of war have the right to visit and search all private vessels,

belligerent or neutral, in order to find out whether they carry goods that are contraband of war. Belligerents have the right to *blockade* the ports of their enemies and to stop all trade through these ports (see BLOCKADE). The vessel which attempts to enter or leave a blockaded port is subject to capture and confiscation after it has been brought before a prize court.

Neutral States during War. During war neutral states must abstain from doing anything which may be considered an unfriendly act by any of the belligerents. Neutral states must not permit the use of their territory by belligerents or aid belligerents in their warlike operations. But a neutral state is not called upon to prevent the export or transport of arms, munitions of war, or in general, of anything which can be of use to an army or a fleet. Neutral states must not permit belligerents' war vessels to remain in one of their ports more than twenty-four hours, except on account of damage or stress of weather. If the war vessel refuses to leave, it may be seized, held until the war is over, and its officers and crew detained. A belligerent vessel of war may only take, in a neutral port, sufficient supplies of fuel and provisions to enable it to reach a port of its own country. A prize may be brought into a neutral port, on account of unseaworthiness, stress of weather or want of fuel or provisions, but must leave as soon as circumstances justifying its entry are at an end. If it refuses to leave, the neutral power must seize it, release its officers and crew, and interne the prize crew.

Since all nations have an equal right to the freedom of the seas, no belligerent can interfere with, interrupt or render dangerous the operations of neutral trade on the high seas when carried on in accordance with international law. At the same time neutrals cannot restrict the lawful operations of belligerents. But during the War of the Nations fierce controversies raged between neutrals and some of the belligerents on account of many acts committed by the latter. The sowing of mines on the high seas along routes taken by commercial vessels, the use of submarines for attacks without warning on merchant vessels carrying cargo and passengers, were among the chief subjects of complaint between neutrals and belligerents, and caused severance of diplomatic relations and finally war between Germany and the United States. See NEUTRALITY; WAR. R.E.B.

INTERNATIONAL PEACE CONFERENCE. See PEACE CONFERENCE, INTERNATIONAL.

INTERNATIONAL RELATIONS. In 1914 the cannon's roar announced the beginning of a worse struggle among nations than the world had ever dreamed to be possible. The peoples of all lands, in intervals between lurid events, had opportunities in plenty to contrast two world ideas which for decades have dominated the two principal continents. These may be termed *nationalism* and *internationalism*. In the countries committed to nationalism self-interests are magnified, ambition and dreams of power and conquest are the ruling passions, and these feed upon suspicion and distrust of one people against another. Nations believing strongly in internationalism believe in exalting the excellent arts of peace, all the while unafraid of neighboring states and with no potential arms reared menacingly against them; on the contrary, there is a realization that each has interests that are related to the successes or to the failures of the others.

Fortresses which before 1914 were believed capable of withstanding the most violent assaults mark many of the boundaries in Continental Europe at intervals of twenty or thirty miles. Their frowning guns are a dread challenge to the peace and security of neighboring peoples; the tread of hundreds of thousands of men, always under arms, is a constant warning that a weak nation is at the mercy of the strong; the twentieth century has proved the former safe from attack only so long as the passions of the latter are not inflamed.

Travelers in Europe from the English-speaking, self-governing, even-tempered countries of North America marvel at the extent of fortification, the widespread authority of the military arm and the tame acceptance by the people of those conditions which entail enormous expense and which suppress the liberal tendencies of the age.

European countries are small, with one giant exception. The Canadian provinces of Alberta and Saskatchewan, a relatively small part of the great Dominion, are together larger than France and Germany and all of the mainland of Italy. Texas is almost as large as Norway and Sweden; Spain is smaller than the states of Michigan, Ohio, Indiana and Illinois. International boundaries in Europe, as might be expected, are frequently but short distances apart. These man-made dividing lines mark more than variations in political practices, for they separate peoples differing

widely in language, in customs, in dress, and, indeed, in hopes and aspirations. There is little to bind the millions of one crowded country to the people of another; only the necessity of buying and selling among them to provide the essentials of life creates a feeling of interdependence.

All Europe contains only 3,850,000 square miles, including its islands, and its separate governments and languages are more than twenty in number. North America, above the sluggish Rio Grande, contains over 6,750,000 square miles, and this vast area, nearly twice as large as Europe, has but two central governments and but one language. Jealousies may color the utterances of Europeans, yet, whatever they say openly, they realize that the United States has been the world's inspiring example in free government; within the twentieth century they are finding that Canada offers the same quality of peace, prosperity and happiness, and essentially the same kind of democracy.

Had Abraham Lincoln consented to the secession of the Southern states; had he admitted that each state could at any moment, and on any plea, take its departure from the Union, he would simply have given his consent to the complete rupture of the federation. The Southern states would have gone; the border states might have followed them; the Pacific states doubtless would not have long remained. Where the practice of secession, once commenced, would have ended, would be difficult to say. Petty republics would have covered the middle of the continent; each would have had its standing army; each would have had its standing feuds; each would have viewed its neighbors with suspicion, and the stronger would always have been ready for aggression. Canada, in consequence of such conditions, would in self-defense have been compelled to arm, and would always have had to keep a close watch upon the disunited and discordant powers to the south. All this would have been a misfortune, not only for America, but indeed for Europe; for then the potent influence of two nations always at peace and without defenses of concrete and of bristling guns would have been lost on the burdened masses of the Continent.

To-day what do Europeans see in America that they must inevitably wish for themselves? They have a vision of the world idea of internationalism. That world idea which America offers to all the continents is a boundary line between two proud, high-strung, aggressive nations, four thousand miles from ocean to ocean, but across which in more than a hundred years neither nation ever has launched a menacing army or fired a hostile gun.

Grasp that idea. Measure that achievement. A thousand miles up the majestic Saint Lawrence; a thousand miles along the Great Lakes; a thousand miles across the open prairie; a thousand miles across a mighty mountain range—four thousand miles where nation meets nation, where sovereignty greets sovereignty, but with never a fortress, never a battleship, never a gun, never a sentry, never a guard. Thus are international relations fostered in America, an example to all the world. J.A.M.

INTERSTATE COMMERCE ACT, a measure passed by the United States Congress in 1887 to regulate commerce between the states of the American Union. It was demanded as a means to check abuses which had developed from the nation's lack of system in controlling private enterprises which existed solely to serve the public. In European countries governments either own the railroads and various other public utilities or exercise arbitrary authority over them; the policy of the United States until within a few years gave to individuals absolute control of what their capital produced.

After the War of Secession the rapid growth of commerce between the states, the almost incredible increase in railway mileage and the utter dependence of all communities upon railway facilities led to the possibility of abuses. By a system of rebates the large shipper could put his goods upon the market at less cost than the competitor who paid full freight rates; shipping facilities could be extended to one and withheld from another; higher rates for short than for long hauls could be exacted; and pooling agreements between roads were possible. Individual states had passed restrictive laws to correct such of the above tendencies as they could reach, but their authority could not be exercised beyond the boundary of the state; interstate traffic was not affected by any measure a state might adopt.

Several attempts had been made in Congress to remedy existing evils, but without result until in 1886, when a Congressional committee again investigated the entire field of common carriers and recommended the passage of a law to regulate interstate traffic. The next year, 1887, the Interstate Commerce

passed, and with several later amend-
ıs been the means of such fair regula-
commerce that transportation com-
ıd other interstate corporations, once
pposed to the law, are now, with rare
ıs, working in complete harmony with
ıo administer it. For nearly twenty
s administration was discouragingly
lack of sufficient power and authority
the statute, but sundry amendments
ıedied these defects. Some of the dis-
features of the act in its present form
'ollowing:

ıe operation of the law is in the hands of
'state Commerce Commission (see be-

nendments in 1896 extended the scope
w so that it covers all common carriers,
sleeping car companies, telegraph, cable
hone companies, express companies and
s. Only railroads were embraced in the
ıct.

igher proportionate rates cannot be
'or a short distance than for a long haul,
unusual cases and then only by permis-
licly granted.

ıy agreement between carriers which
for pooling of traffic and division of
illegal.

l rates are to be made public before be-
ffective and are not to be changed with-
ission. If the Commission believes any
oo high, it may arbitrarily reduce that
its action is subject to review by the
insure justice.

ebating is made punishable by fines which
ssessed to an amount as high as $20,000.

ıe Commission has power to prescribe
nethods of accounting, and its employees
ı access to the books of record of any
on demand.

ıe number of working hours per day on
carriers is limited to eight.

fenses against any provision of the act
emeanors.

ate Commerce Commission. To en-
e provisions of the Interstate Com-
.ct a permanent commission of five
was created under the law of 1887 and
l to seven members in 1906. Mem-
ıppointed for seven years by the Presi-
h the approval of the Senate, and are
d from engaging in any other business
oyment during their terms of office.
ıber whose term first expires usually is
ı of the Commission. The salary is
ıer year.

Commission has extensive power to
nto the management of the affairs of
ıon carriers transacting interstate busi-
ıe traffic which comes under its obser-
enormous, the railroads carrying more than 1,500,000,000 tons of freight and about 900,000,000 passengers each year, over 250,000 miles of rails; this is but one side of the Commission's interests, although the most important. During a year nearly a thousand formal complaints respecting the manner in which the country's immense volume of interstate business is transacted are filed with the Commission. All of these are made public as soon as filed. Much of the time of the Commission is consumed in the interpretation of interstate commerce laws. A court will not recognize a case until legal action has been commenced on it, but the Interstate Commerce Commission is always ready to make rulings on cases which might possibly arise, and thus interested parties learn in advance what the Commission believes it is legal for them to do. The Commission is required to report to the Attorney-General of the United States all cases that come to its notice of violations of criminal sections of the interstate commerce laws.

A special judicial tribunal, the United States Commerce Court, was established in 1910 as an auxiliary to the Interstate Commerce Commission, but this was abolished by act of Congress in 1913, and its jurisdiction was vested in and transferred to the several United States District Courts. Provision was made that its judges should be continued as circuit judges and assigned to duty in the several Circuit Courts of Appeal, and that after an office became vacant by reason of the decease of the incumbent or for other reasons it should be abolished. E.D.F.

INTERVEN'TION, the forceful interference of a nation in the internal affairs of another sovereign state. This phase of international relations is illustrated by the action of the United States government in April, 1898, when, in the interest of humanity, it made a formal demand on Spain to withdraw its troops from the island of Cuba, then in insurrection (see CUBA, subhead *History*). According to international law a state may intervene in the concerns of another whenever the latter is conducting its affairs in such a way as to threaten the peace and safety or to injure the property and persons of citizens of the intervening state. By many authorities it is believed that intervention is also justified on moral grounds, such as the prevention of useless bloodshed.

INTESTACY, *in tes' ta si,* in law, the state or condition of dying without leaving a will, or of leaving a will that has such defects as to render it illegal. The person is said in that

case *to die intestate,* and his property descends to his lawful heirs. In the United States the effect of intestacy varies in accordance with the inheritance laws, which differ in the several states of the Union; but in Canada and Great Britain it does not affect real estate, which is disposed of by the rule of descent.

Related Subjects. The reader is referred to the following articles in these volumes:

Heir	Real Estate
Personal Property	Will

INTESTINE, *in tes' tin.* The muscular, hose-like tube conveying food from the lower end of the stomach to its point of outlet is called the *intestine,* and is divided, in accordance with its size, into two portions, a large and a small intestine.

The *small intestine* runs from the stomach a distance of about twenty feet to the point where it joins or empties into the large intestine. It is doubled up into an apparently shapeless mass, but is nevertheless held in the same relative position throughout life and carries on the part of digestion not finished by the stomach, serving in its upper part to mix the juice from the liver and pancreas with its own secretion. It is a muscular tube, propelling its contents along by successive contractions called *vermicular,* or *like the movement of a worm.* It changes the food into nourishment for the body; the food is then absorbed into the body tissues (see DIGESTION).

The *large intestine* is about five feet long, and is less crooked than the small. The *caecum* is that part of the large intestine which extends beyond the point where it is joined by the small intestine. From the caecum projects a hollow, fingerlike tube, which is called the *vermiform appendix.* On the right side of the abdominal cavity, where the small intestine opens into the large, begins that portion of the large intestine known as the *colon.* This extends upward *(ascending colon),* across the middle line below the stomach *(transverse colon),* and then passes downward on the left *(descending colon).* It finally makes an S-shaped turn in the lower left side of the abdomen, ending in a narrow tube called the *rectum.* It is through the rectum that solid waste matter is expelled from the body.

The large intestine is an important cleansing organ, and it is therefore necessary to keep it in an active condition. When its movements become sluggish, producing constipation, waste matter accumulates in the body, and this condition may bring on serious diseases. By exercising, drinking plenty of pure water and eating freely of fresh fruits and vegetables one can usually avoid this common ailment. Bran bread or muffins are often helpful in overcoming constipation, and the most stubborn cases will usually yield to the regular use of pure mineral oil. This oil has none of the objectionable features of patent laxatives, which afford temporary relief but at the same time aggravate the malady.

Among the diseases whose seat of activity is the intestinal tract are typhoid fever, cholera and hookworm. Each of these is treated in these volumes under its proper heading. Intestinal disturbances are frequently the cause of dyspepsia. Appendicitis (which see) is caused by inflammation of the vermiform appendix. W.A.E.

For illustration of the intestine, see the article ABDOMEN.

INTOL'ERABLE ACTS, in American history, the name given to five measures passed by the British Parliament early in 1774, to punish the people of Massachusetts for their destruction of the tea sent into Boston harbor in December, 1773 (see BOSTON TEA PARTY). These laws were as follows:

(1) The first, called the Boston Port Bill, ordered the port of Boston to be closed until the people paid for the tea they had destroyed. The customhouse was removed to Marblehead.

(2) The second provided that any officer or soldier of the Crown who was arrested for murder should be sent to England for trial.

(3) The third act changed the charter of Massachusetts, made provision for a military governor, and forbade the people to meet in public assembly without the governor's permission, except for the purpose of electing officers.

(4) The fourth law required the colonists to furnish the soldiers who were quartered among them with shelter, firewood, drink, bedding, soap and candles.

(5) The fifth, called the Quebec Act, extended the Province of Quebec southward to the Ohio, and granted freedom of worship to Roman Catholics in the province.

The Five Intolerable Acts only served to unite the thirteen colonies for the common defense of their liberties, and they therefore hastened the outbreak of the Revolutionary War (see REVOLUTIONARY WAR IN AMERICA).

INTOX'ICATING BEV'ERAGES. See ALCOHOLIC DRINKS.

INVALIDES, *aN val leed',* HOTEL DES, a home for disabled and needy soldiers, one of the most imposing structures in Paris. The word is French for *invalid.* Its crypt, under the dome, contains the sarcophagus, or coffin,

from a huge block of Russian granite, in lie the remains of the great Napoleon, ited there in 1840. It is one of the ngs of which France is extremely proud, se of the memory of the "Little Cor- ' This institution was erected by Louis in 1670; in 1811 it was reorganized, and since 1832 it has been maintained by the nation. The building has accommodations for 6,000, but the number of inmates is much less. To be entitled to its privileges, a soldier must have served ten years, and he is received only because of poverty or infirmity. See NAPOLEON I, for illustration of tomb.

NVENTION. Boys and girls of to-day, ieir fathers and mothers, too, seldom give ight to the source of the vast number of n conveniences they enjoy and could ell do without. The wonderful facilities ir command are accepted as a matter of . The civilized world is advancing at a wonderful rate that we fail to realize he commonplace of to-day was unheard y a short time ago. Middle-aged people member when they first saw a telephone. s a wonder to them that they could talk en miles and hear the familiar tones of a 's voice above the sputtering and crack- of those first undeveloped instruments. irst street electric light was to them a l—a brilliant light traveling out of a

n They Were Boys and Girls. To read of common things that our fathers and rs never knew about when they were will emphasize the recent progress of orld. Only a few can be named here; it ford instruction to add to the list:

g machines,
lanes,
num kitchen
e,
natic telephones,
nobiles,
n paper,
egister,
ete buildings,
n-picking ma-
ies,
a separator,
ic elevators,
ic furnaces,
Electric stoves,
Electric welders,
Fireless cookers,
Gas mantles,
Hydroplanes,
Kodak films,
Liquid soap,
Mechanical stokers,
Motorcycles,
Moving pictures,
Oil engines,
Periscopes,
Piano players,
Pneumatic tires,
Recording telephones,
Safety razors,
Sending pictures by telegraph,
Steel trains,
Talking machines,
Thermos bottles,
Tractors,
Turbines,
Type-setting machines,
Vacuum cleaners,
Vestibuled cars,
Wireless telegraph,
Wireless telephone,
Wireless torpedoes,
Zeppelins.

When grandfathers and grandmothers were boys and girls these things were unknown:

Acetylene,
Airbrakes,
Arc lamps,
Block signals,
Carpet sweepers,
Celluloid,
Color photography,
Dynamite,
Dynamos,
Electric light,
Electric motors,
Electric railways,
Elevated railways,
Fountain pens,
Gas engines,
Gasoline,
Hydraulic elevators,
Ice machines,
Paraffin paper,
Phonographs,
Pictures printed in color,
Portland cement,
Rubber tires,
Shoe-sewing machines,
Skyscrapers,
Sleeping cars,
Steel boiler plates,
Steel ships,
Storage batteries,
Submarine cables,
Telephones.

It is but a short period, as time is counted, back to the days of the great-grandparents. Those good people really enjoyed life, but besides being without the common things named above, they knew nothing about the articles named below:

Bessemer steel,
Bicycles,
Binders,
Corn planters,
Cylinder printing presses,
Daguerreotypes,
Electromagnets,
Galvanized iron,
Hard rubber,
Matches,

Mercerized cotton,
Photographic negatives,
Postage stamps,
Prepared paint,
Railroads,
Ready-made clothing,
Reapers,
Screw propellers,
Sewing machines,
Steel rails,
Telegrams,
Threshers,
Typewriters,
Vulcanized rubber,
Wire nails.

Inventions. All of the above are *inventions*—the result of man's ambition to produce something to lessen his work, to make a thing that would increase his comfort, to give to the world that which might possibly bring him fame and wealth.

An invention may be either an entirely new device by which certain work may be accomplished more easily than ever before, or it may consist merely in an improvement in one small part of a machine or implement.

Invention keeps pace with civilization — indeed, which leads the other has often been questioned. It has been said that "Necessity is the mother of invention." Men with investigating minds, possessed of the belief that certain new things were possible and were needed, have wrought for years to perfect many of the devices now ranking among the greatest of inventions. Very few inventions are the result of chance, although their underlying principles are sometimes

disclosed by accident, as in the case of the Welsbach gas mantle and Goodyear's process for vulcanizing rubber. In such cases, nevertheless, it is almost always true that perfection has come only through years of hard work and study.

Seldom does one man conceive an invention and bring it to a finished state. There are frequently as many inventors as there are important parts of an article; the fountain pen is the inspiration of nearly a hundred men, whose work, part by part, has been discarded in favor of later improvements. Thomas A. Edison, who is the greatest inventor in the world's history, says that inventive genius is "two per cent inspiration and ninety-eight per cent perspiration."

Protection to Inventors. Whatever device a man may originate is his personal property; no other man has any right to use it except with the inventor's permission. Laws of all countries recognize this, and each nation guarantees to its citizens or subjects who produce inventions the *exclusive right* to all benefits that may be derived from them. Such a guarantee is in writing, is issued by the government, and is called a *patent* (which see). An inventor may, under his patent, manufacture and sell his device; he may sell all his rights to others and thereafter reap no benefits; he may contract to permit others to make and sell his invention, on an agreement that he shall be paid a certain sum on each sale.

A man who buys a plow purchases a patented article. When he pays for it he gets not only the plow but the right to use it in any way he pleases; he may even sell it again, but he violates the law if he uses that plow as a pattern and makes another like it.

Progress of Invention. In the Bible there appears the phrase, "There is no new thing under the sun." The United States Patent Office officials in 1846 had nearly the same idea, for in that year half their small force was dismissed because it was believed almost everything had been patented that could possibly be invented. In that year 566 patents were issued to citizens of the United States. In 1914 the number granted was 51,650, and during the same year nearly 28,000 other applications were rejected. To the end of 1915 a total of over 1,167,000 patents had been issued. Since 1911 Canada has issued to its inventors an average of about 1,200 patents a year. The Dominion began thus to encourage genius in 1872.

Modern Achievement. Following is a list of some of the great inventions of recent times, arranged in alphabetical order. An asterisk after the name of an inventor indicates that there is a biography of him in these volumes.

INVENTOR	DATE	INVENTION	REMARKS
Woehler	1862	Acetylene process	Gave the world a valuable light.
Wright Brothers *	1903	Aeroplane	The dream of centuries, a man-made bird.
Westinghouse *	1869	Airbrake	Made possible high-speed railway travel. Its efficiency has been doubled since 1890.
Fouche	1905	Autogenous welder	Very efficiently employs oxygen and acetylene.
Hall	1871	Automatic block signal	Made railways safer. The signals are worked by electric currents in the tracks.
Strowger	1889	Automatic telephone	Requires no central operator.
Montgolfier Brothers	1783	Balloon	The first invention to carry men in the air.
Bessemer *	1855	Bessemer process	Shortened the process of steel making 99 per cent.
Michaux	1855	Bicycle	Till the automobile, the greatest advance in road transportation.
Bunsen *	1855	Bunsen burner	Was the foundation of efficient gas lighting.
Felt	1889	Calculating machines	Add and multiply, subtract and divide more rapidly than the brain can do these things.
Bissell	1876	Carpet sweeper	Saves work and prevents dust in millions of homes.
Roberts	1907	Caterpillar tractor	Makes power-farming possible in very soft or rough ground.
De Laval	1887	Centrifugal cream separator	Saves farmers hundreds of millions of dollars.
Du Hauron	1869	Color photography	Will some day supersede black and white pictures.
Whitney *	1792	Cotton gin	Made possible the great growth of the American cotton industry.
Campbell	1910	Cotton picker	Does the work of twenty-five laborers.
MacArthur } **Forrest Brothers** }	1887	Cyanide process	Has enormously increased the world's output of gold.
Hoe *	1847	Cylinder printing press	Developed modern high-speed newspaper printing.
Daguerre *	1839	Daguerreotype	Considered marvelous in its day.
Giffard	1852	Dirigible airship	An early predecessor of the famous Zeppelin.
Berliner *	1887	Disk records	The permanent phonograph records of to-day.
Nobel	1867	Dynamite	The most useful explosive.
Brush	1878	Electric arc lamp	The first efficient street light.
Grounelle	1852	Electric automobile	With a modern storage battery this machine would have been a success.

INVENTOR	DATE	INVENTION	REMARKS
Otis Co.	1887	Electric elevator	Increased the height of buildings.
Heroult	1887	Electric furnace	Makes carborundum, the hardest manufactured substance; calcium carbide for acetylene; artificial diamonds. Has reduced the cost of aluminum over 97 per cent.
Edison *	1879	Electric light	The safest and most useful artificial light.
Stone	1902	Electric lighting for trains	Makes it possible to light sleeping-car berths.
Pacinotti, Gramme, Siemens, Halske	1860	Electric motor	Harnessed the most wonderful known force.
	1879	Electric railway	Makes the modern city a unit and the farmer a suburbanite.
Plante	1860	Electric storage battery	Now used in submarines and electric automobiles.
Thomson	1886	Electric welder	Joins metals previously unweldable.
Otis	1853	Elevator	Made modern skyscraper practical.
Otto	1876	Gas engine	Made automobiles and aeroplanes possible.
Pintsch	1891	Gas lighting for railway cars	By compression of gas.
Welsbach *	1884	Gas mantle	Multiplied the efficiency of gas light.
Daimler	1890	Gasoline automobile	The greatest mechanical factor in social progress.
Rittman	1915	Gasoline refining process	Gives several times the former amount of gasoline from petroleum.
Lilienthal	1890	Glider	The forerunner of the aeroplane.
Bohnenberger	1817	Gyroscope	Stabilizes aeroplanes, ships and monorail cars.
Goodyear	1851	Hard rubber	Used in fountain pens, telephone receivers and other articles.
Otis Co.	1872	Hydraulic elevator	Added speed and safety.
Beach	1869	Hydraulic tunneling shield	Used in boring under rivers.
Carre	1860	Ice-making machinery	Gives ice to warm climates.
Tesla *	1888	Induction motor	Made possible to-day's extensive use of electric power.
Lamb	1866	Knitting machinery	Makes stockings without seams.
Heathcot	1809	Lace-making machine	Works faster and more cheaply than hand workers.
Mergenthaler	1888	Linotype	Sets type several times as fast as hand methods.
Walker, Phillips	1837	Matches	Superseded the flint and more ancient methods of fire making.
Hulett	1898	Mechanical ore unloader	Reduced cost of handling ore, in some cases two-thirds.
(Several)	1915	Mechanical stoker	Increases efficiency of railroad locomotives.
Mercer	1851	Mercerizing process	Makes cotton look like silk.
Edison *	1887	Moving picture	Brings amusement and education to millions daily.
Sprague	1901	Multiple unit control	Makes any car the engine of a train.
Edison *	1878	Multiplex telegraph	Sends several messages over one wire at the same time.
Diesel	1893	Oil engine	Used in battleships and ocean liners.
Drake	1859	Oil wells	First sunk for kerosene, now more valuable for gasoline.
D'Albe	1913	Optophone	Makes the blind hear light.
Edison *	1877	Phonograph	Brings good music to thousands and is useful commercially.
Eastman	1887	Photograph film	Makes it unnecessary to carry heavy apparatus.
Talbot	1839	Photographic negative	From which unlimited prints can be made.
Niepce	1827	Photography	The greatest of useful arts. Niepce's process required several hours' exposure.
White	1897	Piano player	Reproduces mechanically the playing of artists.
Dunlop	1890	Pneumatic tire	Takes the jolts and jars out of automobiling and bicycling.
Lürman	1862	Portland cement	One of the most important elements in modern building.
Stephenson *	1833	Railroad locomotive	The greatest step in the history of transportation.
McCormick *	1831	Reaper	The first great farm-labor saver in history.
Monier	1867	Reënforced concrete	Originally intended for flower-pots, has become the material of skyscrapers.
Thevanon	1865	Rubber tires	Now used on auto-trucks, carriages and electric vehicles.
Goodyear *	1840	Rubber vulcanizing	Made rubber one of the most useful substances.
Pasch	1844	Safety match	Now required by law in some countries.
Ericsson *	1839	Screw propeller	Increased the speed of ships.
Howe *	1846	Sewing machine	Made possible the factory system in clothes making.
McKay	1860	Sewing machine for shoes	Revolutionized the shoe industry.
Pullman *	1864	Sleeping car	Suitable for both day and night travel.
Fulton *	1807	Steamboat	Reduced the time of crossing the ocean from weeks to five days, and made river navigation possible.
Watt *	1773	Steam engine	Has transformed the commercial world.
Parsons	1884	Steam turbine	Lowered cost of steam power; abolished pounding of steam engines.
Wood	1797	Steel plow	Farmers at first feared it would poison the soil.
Laws	1866	Stock ticker	A printing telegraph for the stock market.

INVENTOR	DATE	INVENTION	REMARKS
Bushnell	1775	Submarine	Used by Americans in the Revolutionary War. The dreaded "scorpion of the seas" in the War of the Nations.
Field *	1866	Submarine cable	Joined all nations in instant communication.
Winans	1834	Swivel truck	Made long railroad cars practicable. They could turn on short curves.
Gray *	1890	Telautograph	Transmits drawings and writings by telegraph.
Morse *	1835	Telegraph	Annihilated distance in communication.
Bell *	1876	Telephone	"The most valuable American patent."
Poulsen	1898	Telephonograph	A recording telephone.
Pedersen	1898	Telephonograph	A recording telephone.
Roberts	1852	Thresher	Made necessary by the huge crops following the invention of the reaper.
Just & Hanaman	1903	Tungsten light	Lasts longer, gives more light, uses less power.
Clerk	1879	Two-cycle gas engine	The type most used in motor boats.
Thurber	1843	Typewriter	Has almost supplanted hand writing in industry.
Sessions	1887	Vestibuled cars	Makes it safe to pass from car to car, and keeps out dirt.
Flowers	1913	Voice-controlled writing machine	Not yet perfected.
Bell *	1886	Wax removable records	Replaced Edison's tinfoil.
Tainter	1886	Wax removable records	Replaced Edison's tinfoil.
Tesla *	1898	Wireless-controlled boats and torpedoes	Can be steered from shore.
Marconi *	1895	Wireless telegraph	Makes sea travel safer.
Bell Co. Engineers	1915	Wireless telephone	Has carried the human voice from Virginia to Hawaii, 4,900 miles.

Some Old Inventions. In more remote times there were many new devices whose stories have been recorded. Many of these old inventions suggested ideas to modern minds. Of these articles the following are perhaps the most important:

B. C.		
Third century	Archimedes*	Compound pulley, and his screw for raising water, still used in Holland.
130	Hero	Steam engine.
First century		The Gauls employed a reaper. The Roman accounts of it suggested the modern machine.
A. D.		
717		The Greeks used gunpowder at the siege of Constantinople.
Tenth century	Pope Sylvester II*	Pendulum clock.
1450	Gutenberg*	Printing press with movable type.
1481	Branca	Canal locks, built by two brothers of Viterbo, Italy.
1629		Steam turbine.
1709	Cristofori	Pianoforte.
1738	Labelye	Caisson, for bridge building.
1742	Franklin*	Stove.
1764	Hargreave*	Spinning jenny, spun ten threads at once.
1767	Arkwight*	Spinning frame.

E.D.F.

INVERNESS, *in'vur nes,* a town in the county of the same name, on Cape Breton Island. It is noted as a coal-mining center, and the collieries are the support of most of the inhabitants. Inverness is on the west coast of the island, about 150 miles directly west of Sydney. It is the northern terminus of the Inverness Railway & Coal Company's line, which connects with the Intercolonial Railway at Port Hawkesbury. Gypsum, fire clay and some copper are found in the vicinity. Population in 1901, before the town became a mining center, 306; in 1911, 2,719; and in 1916, estimated, 3,500.

INVERTEBRATES, *in ver'te brates,* or **INVERTEBRATA,** *in ver te bra'ta,* animals without backbones, as opposed to *vertebrates,* or animals having backbones. To the invertebrates, which constitute much the larger division of the two, belong the one-celled animals, or protozoa, the sponges, sea anemones, corals and jellyfishes, worms, insects and spiders, shellfish and all other mollusks. This distinction has been considered very clear until, in recent years, it has been discovered that some forms of life do not classify perfectly under either division. There are about 500,000 known species of invertebrates, many of which are of peculiar interest to man.

Related Subjects. For a detailed understanding of these lower forms of animal life the following articles should be considered. The first group consists of general articles, each of which contains a list showing its subdivisions; the second group refers merely to individual articles.

GENERAL TOPICS

Arachnida
Crustaceans
Insect
Mollusks

SPECIFIC NAMES

Amoeba
Bookworm
Coral
Crinoidea

Cutworm	Polyp
Daphnia	Protozoa
Earthworm	Sea Anemone
Earwig	Sea Cucumbers
Hairworm	Sea Urchin
Hookworm	Sponge
Hydra	Starfish
Jellyfish	Tent Caterpillar
Leech	Trepang
Lobworm	Vermes
Measuring Worm	Worms

INVOLUTION, *in vo lu'shun,* in mathematics, is the process of raising a number to any required power. By *power* is meant the product obtained by using the number two or more times as a factor. For example, 64, the product obtained by using 4 three times as a factor, is the *third power* of 4, since $4\times4\times4=64$. The power is indicated by a small figure, called an *exponent,* which is placed at the right of and a little above the number. Thus:

$3\times3=3^2=9$, the second power of 3.
$3\times3\times3=3^3=27$, the third power of 3.
$3\times3\times3\times3=3^4=81$, the fourth power of 3, etc.

The first power of a number is the number itself; thus $3=3^1$. When a number is taken twice as a factor it is said to be *squared;* when taken three times it is *cubed.* Also the second power of any number is its square, and the third power its cube.

When a fraction is raised to any power, both the numerator and denominator must be raised to that power. For example, the fraction $\frac{3}{4}$ raised to the third power $=$

$$(\tfrac{3}{4})^3=\frac{3\times3\times3}{4\times4\times4}=\frac{27}{64}.$$

The product of any two powers of a number may be found by adding the exponents and raising the number to the power indicated by the sum. Thus, $4^2\times4^3=4^{2+3}$, or 4^5, or 1,024. Again, when it is required to raise a number with an exponent to any power, such as $(3^2)^3$, the exponents may be multiplied and the product be considered the exponent of the number to be raised. Thus, $(3^2)^3=3^{2\times3}$, $=3^6$, $=729$. Any number, therefore, is raised to the sixth power when its square is cubed; likewise cubing its cube raises it to the ninth power.

By the application of the following rule, the square of any number composed of two figures may be found:

The square of any number composed of two figures is equal to the square of the tens, plus twice the product of the tens and the units, plus the square of the units.

Square 35.

Process: $(35)^2=30^2+2(30\times5)+5^2=900+2(150)+25=900+300+25=1{,}225$.

A number consisting of two figures may be cubed by applying the following rule:

The cube of any number consisting of two figures is equal to the cube of the tens, plus three times the product of the tens squared and the units, plus three times the product of the tens and the units squared, plus the units cubed.

Cube 35.

Process: $(35)^3=30^3+3(30^2\times5)+3(30\times5^2)+5^3=27{,}000+3(4{,}500)+3(750)+125=27{,}000+13{,}500+2{,}250+125=42{,}875$.

The process of finding the root of a number, the reverse of involution, is known as *evolution* (which see). B.M.W.

IO, *i'o,* in Greek mythology, the daughter of the king of Argos, beloved by Zeus, who, to protect her from the jealousy of Hera, changed her into a white heifer. Hera contrived, however, to obtain the animal from Zeus, and gave her to the care of the hundred-eyed Argus, from whom she was rescued by Hermes. Hera then sent the gadfly to torment the unfortunate Io, and the latter wandered all over the world in her attempts to escape from her tormentor. In Egypt she found rest and freedom from persecution. On the banks of the Nile she assumed her original form. Her son Epaphus, later king of Egypt, was the reputed founder of the famous city of Memphis.

IODINE, *i'o din,* a heavy, lustrous, bluish-black, solid substance, usually occurring in flat crystals. It has a disagreeable odor resembling that of chlorine, but much milder. When heated it yields the violet vapor to which it owes its name (from the Greek *iodes,* meaning *violetlike*). Iodine was discovered in 1812 by B. Courtois, a French manufacturer of saltpeter. He found it in kelp, the ashes of seaweed. The chemists Clement, Gay-Lussac and Sir Humphry Davy examined the new substance and pronounced it an *element* (see CHEMISTRY). Iodine melts at 237° F. and boils at 363°. Its vapor is one of the heaviest gases known, being nearly nine times as heavy as air and so dark in color that a vessel four inches wide filled with it looks black and quite opaque. Pure water will dissolve only one-six-thousandth of its own weight of iodine, but water containing half its weight of potassium iodide will dissolve its own weight of iodine. The solution so obtained is dark brown in color. More dilute solutions are red or yellow. Iodine likewise forms brown solutions in alcohol, ether and glycerine, but in chloroform, carbon disulphide, benzine and light petroleum oils

tine or gasoline) it forms violet-colored ions.

ıcture of iodine used in medicine is made ıixing one-half ounce each of iodine, po- ım iodide and water and then adding gh alcohol to make up a pint. To pre- its staining the skin the tincture is some- ı decolorized by adding ammonia. Iodine ed in medicine as a "counter-irritant" to :e swellings and allay inflammation, an n probably due to its antiseptic proper- It is also used in photography, in the ıfacture of dyes and in analytical chem-

emically, iodine is a very active non- l, closely related to chlorine and bromine. these it combines energetically with the ls. Antimony powder thrown into iodine r burns spontaneously. Mercury and io- warmed together combine with evolution uch heat. Phosphorus brought in contact it melts and takes fire. With starch ms a blue coloration. This affords a most ıte test for either starch or iodine, said to ıpable of detecting one part of iodine in nillion parts of water.

ıny of the compounds of iodine are inter- g. That with hydrogen is a heavy and dingly soluble gas (see ABSORPTION), its ion being a strong acid like hydrochloric The iodides of silver and lead, which are w substances, may readily be obtained as tiful precipitates by mixing a solution of sium (or sodium) iodide with one of silver te or lead acetate. The red iodide of mer- can be made not only by mixing solu- of potassium iodide and mercuric chlo- but also by grinding these two white ı together in a mortar. Potassium iodide, ı is the commonest iodine compound in nerce, is used extensively in medicine. of its uses is as an antidote for lead or ury poisoning. Silver iodide is used in ographic dry plates. Iodoform, a com- d with carbon and hydrogen, is used as ıtiseptic in dressing wounds.

all quantities of iodine compounds are l widely distributed throughout the min- and vegetable kingdoms and even in ani- The thyroid gland, situated in the neck, tes an iodine compound, and in treating ses due to the ill-development of this , a preparation from the thyroids of sheep ed as a medicine to increase the store of compound. Certain seaweeds have the erty of absorbing iodides from the sea water, in which they are present in such small proportions that they can scarcely be detected by chemical means. For a long time such seaweeds were the chief source of iodine, and a small part of the world's supply is still made from them. The great bulk of the present supply, however, comes from Chile, where iodine is obtained cheaply as a by-product of the purification of sodium nitrate (Chile saltpeter). The Chilean manufacturers have combined to limit the export and keep up the price, which steadily advanced from $2.60 a pound in January, 1912, to $4.25 a pound in January, 1916, wholesale in New York. See MEDICINE AND DRUGS. J.F.S.

IODOFORM, *i o'doh form,* small, yellow crystals formed by a combination of hydrogen, carbon and iodine, and having a sweetish odor and unpleasantly sweet taste. Iodoform will dissolve in ether, oils or alcohol, and in this form or as an ointment it is used as an antiseptic for wounds and sores. Although it is useful as a disinfectant, less disagreeable and less poisonous substitutes are usually employed.

IOLA, *i o'la,* KAN., the county seat of Allen County, situated in the southeastern section of the state, and on the Neosho River. Kansas City is 110 miles northeast and Wichita is 100 miles west and south. The Atchison, Topeka & Santa Fe, the Missouri Pacific and the Missouri, Kansas & Texas railroads serve the city. The town was organized by the Iola Town Company in 1859; it became the county seat in 1865 and was chartered as a city in 1898. In 1913 the commission form of government was adopted. The population increased from the official count of 9,032 in 1910 to 11,068 in 1916, by Federal estimate.

Iola is a wholesale distributing point for agricultural produce. Following the discovery of natural gas in this territory in 1896, several immense zinc smelters and a number of brick plants were established here. Besides these, there are large Portland cement plants, shirt and overall factories and iron and marble works. Iola has a Federal building, in which is located a United States Weather Bureau station, a $50,000 county courthouse, a Y. M. C. A. building, a $15,000 Carnegie Library and several fine churches. In connection with the public schools an agricultural course and a manual training department are maintained.

I'ON. In electricity ions are minute particles of matter which are oppositely charged. For example, sulphuric acid, which is composed of hydrogen two parts, sulphur one part and oxy-

gen four parts, may be separated into hydrogen and sulphuric oxide. The hydrogen particles may be positively electrified, consequently they form positive ions, and the sulphuric oxide particles may be negatively electrified, and they form the negative ions. In physics these are known respectively as *anions* and *cations*. See ELECTROLYSIS; ELECTRICITY.

IONIA, *i o'ni a,* the ancient name of a region inhabited by Ionian Greeks, comprising the district along the western coast of Asia Minor from the River Hermus to Mount Latmus, and the neighboring islands of the Aegean Sea. Ionia was the cradle of the earliest development in Greek poetry, philosophy and art. In the familiar legends the Ionians of Asia Minor were colonists from Attica who left their homes in Greece about the middle of the eleventh century, B. C. At some unknown date they founded a confederacy of twelve towns, which, though mutually independent, were united for the common good. Famous among these towns were Ephesus, in which stood the celebrated Temple to Diana, one of the seven wonders of the ancient world; and Miletus, distinguished as the birthplace of many philosophers and historians (see EPHESUS; MILETUS).

In the sixth century B. C. the Ionian cities came under the sway of the kings of Lydia, the last of whom, the gold-loving Croesus (which see), was conquered by Cyrus the Great in 546 B. C. Ionia then became a part of the Persian dominions, and half a century later the cities made a courageous but unsuccessful effort to regain their independence. The assistance given them in this revolt by the Athenians led to the memorable invasion of Greece by Darius I (see PERSIA, subhead *History*). After the defeat of Persia by the Greeks, Ionia remained a dependency of Athens until the close of the Peloponnesian War in 404 B. C., when the country again fell under Persian rule. Later the cities were conquered by Alexander the Great, and in 64 B. C. Ionia became a part of the Roman province of Asia. Time and the devastating hand of the Turks have destroyed nearly all traces of the ancient civilization.

IONIAN, *i o'ni an,* **ISLANDS,** a group of islands belonging to Greece, most of which lie in the Ionian Sea, an arm of the Mediterranean. They consist of six large islands and a number of islets, and are divided into three main groups. Off the west coast of Epirus is the most northern group, that which comprises Corfu and the smaller Paxos; the second division, consisting of Santa Maura, Ithaca (which see), Cephalonia and Zante, lies about the entrance to the Gulf of Corinth; the third group, consisting of Verigo and several dependent islets, lies directly south of Greece in the Mediterranean Sea. They have a combined area of 1,117 square miles and a population of about 227,000. Geographically the islands show many differences, but their surface is for the most part mountainous.

On the division of the Roman world in 395, the Ionian Islands became a part of the Eastern, or Byzantine, Empire, and during the Middle Ages they came into the possession of the republic of Venice. After the Napoleonic wars they were reorganized and made a republic under the protection of Great Britain, a form of government which lasted until 1864, when they were annexed to Greece by consent of the European powers.

IONIANS, *i o'ni anz,* one of the four great families or tribes of the ancient Greeks, distinguished from the Achaeans, Aeolians and Dorians, not only by their artistic and literary superiority, but by a greater love for peace and for luxury. They inhabited Attica, the Cyclades, and the coast of Asia Minor, but whether the Greek mainland, the island region or the Asiatic shore was their original home, scholars cannot determine. Of all the Ionians the Athenians reached the highest plane of civilization, but they were not of the purest stock.

IONIAN SEA, a portion of the Mediterranean Sea named after the river nymph Io, who, according to the ancient legend, swam across this sea to escape the persecutions of a gadfly which Hera had sent to torment her. Lying south of the Adriatic Sea, with which it is connected by the Strait of Otranto, it separates Italy and Sicily from Albania and Greece. The Ionian Islands are located along its eastern margin off the coast of Greece. See Io.

I. O. U., an abbreviated or phonetic method of writing *I owe you.* It thus forms an acknowledgement or memorandum of a debt, and for formal purposes is usually worded thus:

Chicago, July 14, 1917.

To John Brown. I. O. U. Fifty Dollars.

THOMAS BROWN.

Such a memorandum, since it includes no promise to pay, is not really a promissory note, but in law it is sometimes recognized as such. In certain states, for instance, it may be endorsed and transferred, like a promissory note. An I. O. U. is strong but not conclusive evidence in a suit. The form is used more frequently in England than in the United States.

IOWA, a north-central state of the American Union, was named for a tribe of Sioux Indians who in the early years of the eighteenth century inhabited the prairies which make up the present state. Popularly, Iowa is known as the HAWKEYE STATE, probably in allusion to an early editor who, because of his genius for spying out news, was called "Old Hawkeye." As its flower the state has chosen the wild rose, the choice being made by the legislature and not, as in many states, by the school children; and anyone who has traveled through Iowa in the late spring or early summer will admit the wisdom of the choice.

Size and Location. In size Iowa ranks among the states as the twenty-fourth in area. It is, roughly speaking, a rectangle, though very irregular on its east and west sides; it has a north-and-south length of 205 miles, a greatest east-and-west breadth of 310 miles, and an area of 56,147 square miles. The state nearest it in size is Illinois, which is less than 150 square miles smaller. It is nearly one-fourth the size of the Canadian province of Saskatchewan.

North of Iowa is Minnesota; west are South Dakota and Nebraska, the latter separated from it by the Missouri River; south is Missouri, and east are Wisconsin and Illinois, from which it is separated by the Mississippi.

Its People. In population Iowa, with 2,224,771 inhabitants in 1917, ranks fifteenth among the states. It has an average density of forty to the square mile and is more evenly settled than any other state. However, it showed a slight decrease in population between 1900 and 1910, the only one of the states that did so, and later estimates show that the tide has not turned in the opposite direction. People have settled in the state in decreasing numbers in the last two decades because of the opening up of the great Canadian farm lands. Settlers have been attracted to the Dominion, for land there is much cheaper than the rich, cultivated Iowa sections. Iowa has been one of the states which immigrants have found fairly inviting, and almost thirteen per cent of its population is foreign born, while over twenty-nine per cent is native born, but of foreign parentage. Between three hundred and four hundred Indians live on a reservation in Tama County, but these are not Iowa, but Sac and Fox Indians. They are in a very backward condition, refusing to take advantage of any means of progress.

More than two-thirds of the people live under rural conditions, but this proportion is gradually changing, for while the city population is steadily growing, the rural is decreasing. Iowa farmers have been extremely progressive, and were among the first to avail themselves of those advantages—good roads, automobiles, telephones, agricultural clubs—which have done away with isolation and monotony. There are no great metropolitan cities, and only eight with a population of 25,000 or over. Of these the largest is Des Moines, the capital. Others are Sioux City, Davenport, Dubuque, Cedar Rapids, Council Bluffs, Waterloo and Clinton. Each important city of the state is described under its title in these volumes.

Religion. The Roman Catholic Church is the strongest, possessing more than one-fourth of the total church-membership of the state. Of the Protestant churches the Methodists are the most numerous, and have more members than all the other denominations combined, except the Lutherans. The strength of the Lutheran Church is accounted for by the number of Germans and Scandinavians who have made their homes in the state.

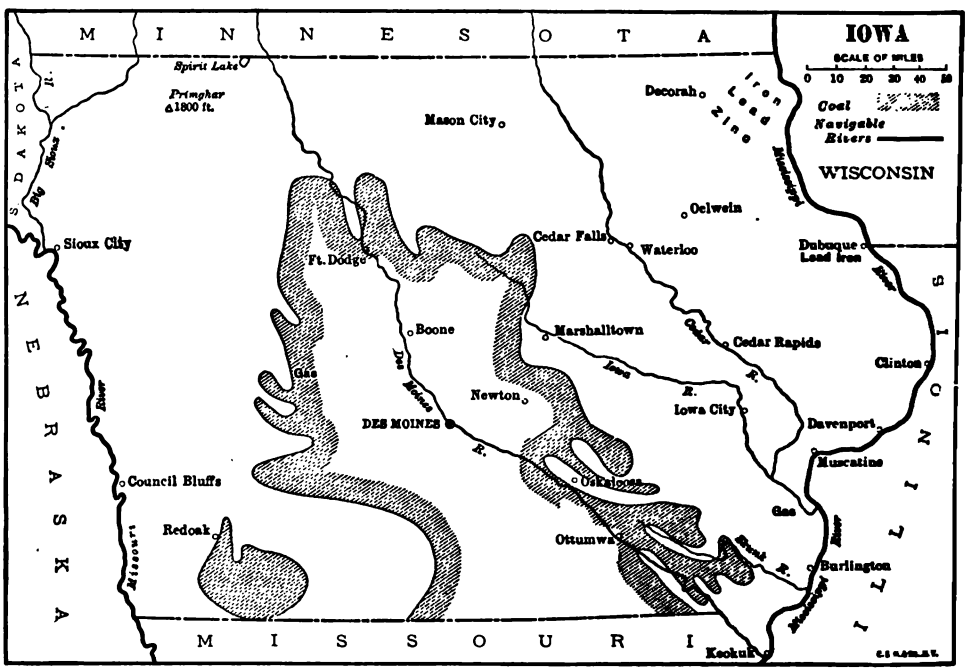
Education. Educationally, Iowa stands in the very front rank among the states, and its percentage of those unable to read and write is lower than that of any other state—only 1.7. The permanent school fund is very small for so large a state, for the public lands set aside by Congress in the early years for the support of the schools were sold at a ridiculously low figure—from $1.25 to $5.00 an acre for some of the richest land in the state. This fund in

no way influences the annual expenditure, however, which in recent years has been over $16,000,000. This is raised largely by local taxation.

As in every state with a large rural population there have been difficult problems, but they have for the most part been met, and the amended compulsory education law, which declares that every child between the ages of seven and sixteen must be in school at least twenty-four consecutive weeks in each year, has resulted in increased attendance in the common schools. Besides the grammar schools there were at the beginning of 1916 over 800 high schools, and many private secondary schools, as well as normals. The state has given careful attention to teacher-training, appropriating, in 1911, $50,000 annually for the introduction of normal classes in the high schools. At the head of the school system is the state superintendent of public instruction, and each county has its own superintendent.

The three state institutions of higher learning are Iowa State University at Iowa City; the State College of Agriculture and Mechanic Arts at Ames; and Iowa State Teachers College at Cedar Falls; and these are under the management of a state board of education. Other schools and colleges are so numerous that it is impossible to list them here, but among the most important are Charles City College at Charles City, Coe College at Cedar Rapids; Des Moines College and Drake University at Des Moines; Grinnell College at Grinnell; Upper Iowa University at Fayette; Cornell College at Mount Vernon; Central University at Pella, and Morningside College at Sioux City. Most of these are maintained by various religious denominations.

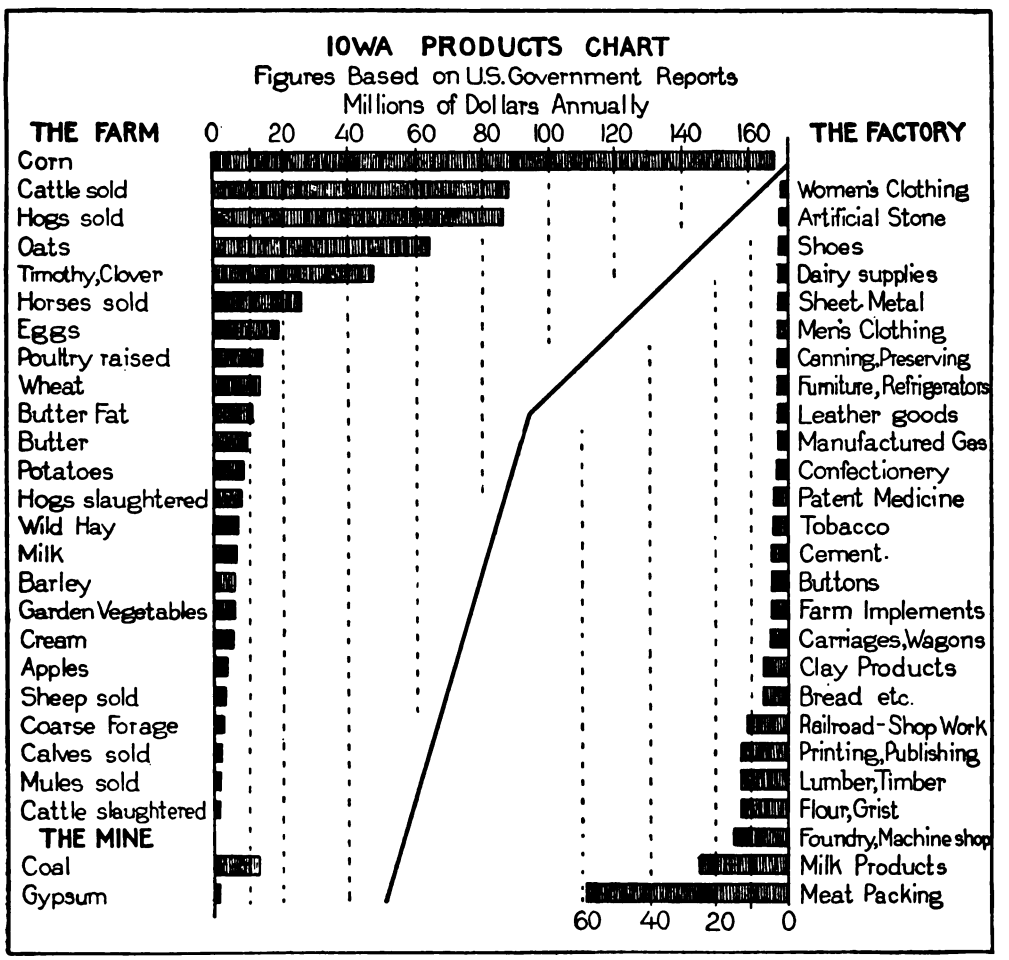
Iowa's Prairies. Iowa might with even more justice than Illinois be called the "Prairie State," for everywhere is the open, rolling country with its long, low swells and broad, shallow valleys. The average elevation is somewhat over 1,000 feet; the slope, so gentle as to be almost imperceptible, is from the northwest to the southeast. In O'Brien County, near the northwestern corner of the state, is the highest point, with an altitude of about 1,800 feet; and at Keokuk, in the extreme southeast, is the lowest point, but 494 feet above sea level. The prairie country is broken occasionally by sharp outstanding hills, but Iowa has no great diversity of surface, its only rough, craggy features being supplied by the bluffs along its rivers.



OUTLINE MAP OF IOWA

Showing the boundaries of the state, principal rivers and cities, location of coal mines, lead, etc., and the highest point of land.

Its Waters. Iowa has a great river on either side, and into these it is drained, two-thirds of its area being drained by tributaries of the Mississippi, the rest by those of the Missouri. The southeasterly flowing streams which empty into the Mississippi are the Des Moines, the largest river of the state, which flows across the central portion; the Iowa, Turkey, Wapsi-



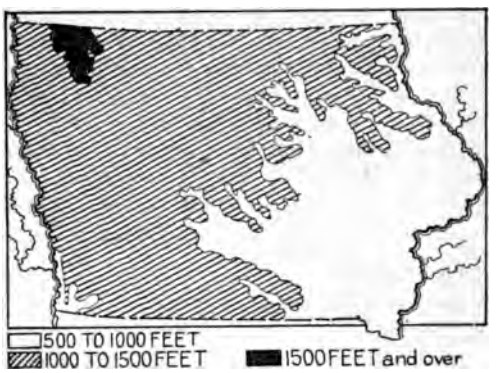
and these constitute the basins of the beautiful little lakes which dot that part of the state. Most famous is Spirit Lake, a favorite summer resort, but Storm Lake, Clear Lake and East and West Okoboji are much visited also.

The Climate. Far from any body of water large enough to have any effect on its climate, and unprotected by mountains from hot or cold winds, Iowa has what is known as a typically continental climate—that is, its extremes of heat and cold are great. The average yearly temperature is 47°, but the highest recorded temperature is 113° and the lowest —43°, a total range of 156°. It is only in very exceptional years, however, that such extremes are experienced. The atmosphere is rather humid, especially in the summer.

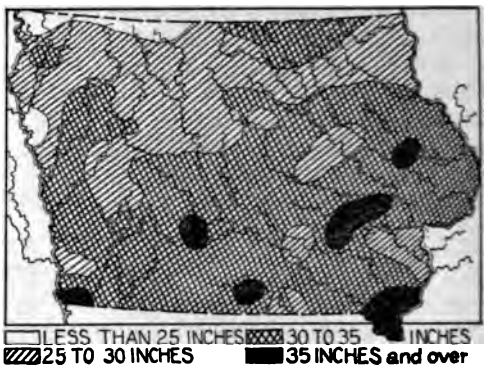
Seldom is the Iowa farmer troubled by drought, for while the average annual rainfall reaches a total of only 31.5 inches, it is dis-

pinicon, Cedar and Skunk; those which flow toward the Missouri are the Big Sioux, Little Sioux, Nishnabotna and Nodaway. Of these only the Des Moines is navigable, and that only slightly at certain seasons of the year, but the state depends little upon water transportation.

Northern Iowa lay in the glaciated area; that is, it was covered ages and ages ago by a slow-moving river of ice (see GLACIAL PERIOD). This, when it retreated, left numerous little hollows carved in the surface of the ground,



ELEVATION ABOVE SEA LEVEL



ANNUAL RAINFALL

tributed through the year in the most favorable manner. That is, over seventy per cent of the rain falls during the growing months, from April to October. The northern part of the state frequently has very heavy snows, which drift before the northwest winds.

Agriculture. Iowa is one of the leading agricultural states in the United States; for years, indeed, it has ranked first in the value of its farm products. Over ninety-five per cent of its land area is in farms, and of this amount eighty-seven per cent is improved. The Iowa farmers have had comparatively few discouraging circumstances to contend with; no irrigation has been necessary; no forests have had to be cut down, no stony ground to be worked over, and practically everywhere the land is level enough to make machinery practicable.

One who travels straight across Iowa in the summer months needs not to ask what the chief crop is, for there stretch away on every side, as far as the eye can reach, endless fields of waving corn. Most years Illinois produces more corn than any other state, though Iowa runs it a close second and sometimes leads. Almost one-third of the cultivated area of the state is planted to corn, and the yield is over 300,000,000 bushels yearly. Next in importance are oats, hay and wheat, in that order, and there are also each year considerable crops of barley and potatoes and other vegetables. In oats, over 160,000,000 bushels, Iowa is second only to Illinois. Orchard fruits, especially apples and grapes and strawberries, are successfully grown, and the flower-raising and nursery industries are of importance.

Stock Raising. Grass-grown prairies, streams of clear, pure water, and abundance of corn and oats are the conditions needed for successful stock raising, and in Iowa these are admirably combined. As a result the state ranks first in the Union in the total value of its live stock, far surpassing all the other states in its number of hogs, and having more cattle than any other state except Texas. It leads in the number of chickens, too, and in its yearly egg output, and stands among the foremost dairy states. Only New York and Wisconsin surpass it in total dairy products. In the number and value of its stock, as in its farm area and crops, Iowa has remained fairly constant for several years.

The Chief Minerals. Coal occupies, among the minerals of Iowa, the same preëminent position that corn does among the crops, about three-fifths of the total output of the mines being coal of the bituminous variety. More than one-third of the state, it is estimated, is underlaid by coal beds, but some of the coal exists under conditions not suitable for mining, so that the workable area is only about 13,000 square miles. Iowa exports little of its annual yield of 7,500,000 tons or thereabouts, finding ample use for it within the state.

Next in importance is clay—the kinds whereof drain-tile and common bricks are made; and in the production of these Iowa ranks high. There is also a large output of cement, and the state is second in the production of gypsum. Years ago the lead and zinc mines were valuable, but to-day they seem almost exhausted and the yield is very small. See map for location of minerals.

Manufactures. For many years the manufactures of Iowa were decidedly limited, just because the agricultural advantages were so great, but gradually manufacturing industries grew out of the agricultural, and within the last two or three decades they have become of very considerable importance. Sioux City is the chief industrial center of the state, Cedar Rapids and Des Moines ranking next.

Naturally enough, in the foremost live stock state of the country, slaughtering and meat-packing ranks first among the industries, the total value of its product being more than twice that of any other industry. Dairy products—factory-made butter, cheese and condensed milk—rank second, and flour and grist-mill products, foundry and machine-shop products and agricultural implements are made in large quantities. Strangely, in a state which contains practically no forests, the lumber industry once attained considerable proportons, logs being brought to the sawmills from Minnesota and Wisconsin. Of late years this industry has declined, as more mills have been erected in the forested states. In general, however, it may be said of the industries of Iowa that they are growing. The increase of the population of the cities at the expense of that of the country districts indicates that more and more wage-earners are turning from the soil to the factory as a means of livelihood. Certain cities, as Sioux City, for example, have had a phenomenal industrial growth, its total manufactures increasing in value over 153 per cent in five years, from 1904 to 1909. The manufacturing towns of the eastern part of the state are expected to be helped by the electric power from the Keokuk Dam (which see).

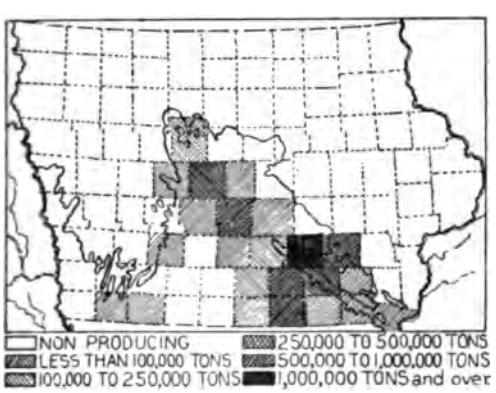
The Mississippi River helps Iowa to one of its most characteristic and interesting industries, by furnishing mussels. From the shells of these are made pearl buttons of a very good quality, the industry centering at Muscatine.

Transportation. The districts along the Mississippi make considerable use of that stream, especially since the difficulties of the so-called Des Moines Rapids have been overcome by the construction of a canal from Keokuk to Montrose; but for the most part the state depends little upon waterways. For like most of these north-central states it has excellent railway transportation, a number of the great transcontinental trunk lines, as the Chicago, Rock Island and Pacific; the Chicago, Burlington and Quincy, and the Chicago, Milwaukee and Saint Paul, crossing it. Its total mileage of 9,998 gives it fourth rank among the states, and affords such excellent facilities that few farms in all the state are more than six or eight miles from a railway station. Des Moines, the capital and chief city, is a railway center of considerable importance.

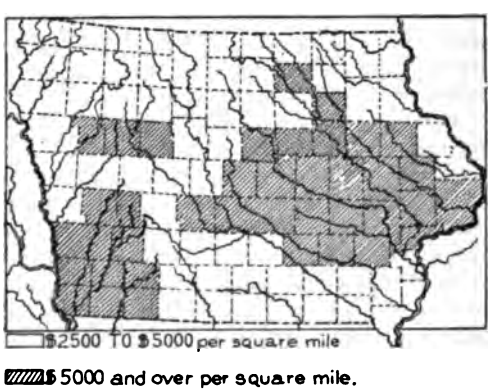
Iowa was not one of the first states to take up the building of electric railways, and only in comparatively recent years have interurban roads been built. At the beginning of 1915 there were within the state 452 miles of such lines.

According to a statute of 1911, Iowa has an official known as the commerce counsel, who stands as the representative of the people in all commercial matters. He investigates the rates imposed by railway and express companies and reports on them, stating whether in his judgment such charges are just.

Government. The constitution adopted when Iowa was admitted to the Union in 1846 remained in force but eleven years, and that under which the state is at present governed dates from 1857. As in most states, amendments may originate in either house of the legislature, and a majority vote of the people, as well as of both houses, is necessary before an amendment becomes an actual part of the constitution. Every tenth year, counting from 1870, the question of revising and amending the constitution is submitted to the people, and if a majority of them favor it, delegates for that purpose are appointed.



PRODUCTION OF COAL FIELDS, PER YEAR



ANNUAL VALUE OF FARM PRODUCTS

The diagrams are made from official figures of the United States Bureau of the Census.

Iowa has few outstanding political institutions and provisions that differ from those of other states. Direct primaries are provided for by statute, and measures dating from 1913 call for the nonpartisan nomination and election of judges and provide for the initiative and referendum (see INITIATIVE AND REFERENDUM). There is in the constitution a clause which forbids the state, except in times of war, to incur a debt greater than $250,000, nor may any debt be incurred without the vote of the people.

At various times prohibition laws have been passed in Iowa, and from 1884 there dates a statute actually prohibiting the manufacture and sale of intoxicating liquors; but this was not well enforced, and was practically succeeded by the so-called "Mulct Law" which made possible the sale of liquor on the petition of a certain proportion of the voters of each county. On January 1, 1916, a new state-wide and effective prohibitory law went into effect.

The executive officials, the governor, lieutenant-governor, secretary of state, auditor, treasurer, attorney-general and superintendent of public instruction, are elected for terms of two years each. The governor, secretary of state, auditor and treasurer compose an executive council which has special powers, such as directing the taking of the census, auditing the accounts of the state departments, providing for the incidental expenses of the state officials, and canvassing election returns.

The legislative department consists of the usual two houses, a senate of fifty members and a house of representatives restricted to 108 members. Representatives are elected for two years and senators for four years; the terms of one-half the senators expire every two years. Sessions are biennial, and a majority of all the members elected to each house is necessary to the passing of a bill. The house of representatives alone has power to bring impeachment proceedings, the senate constituting a court before which such a trial is brought.

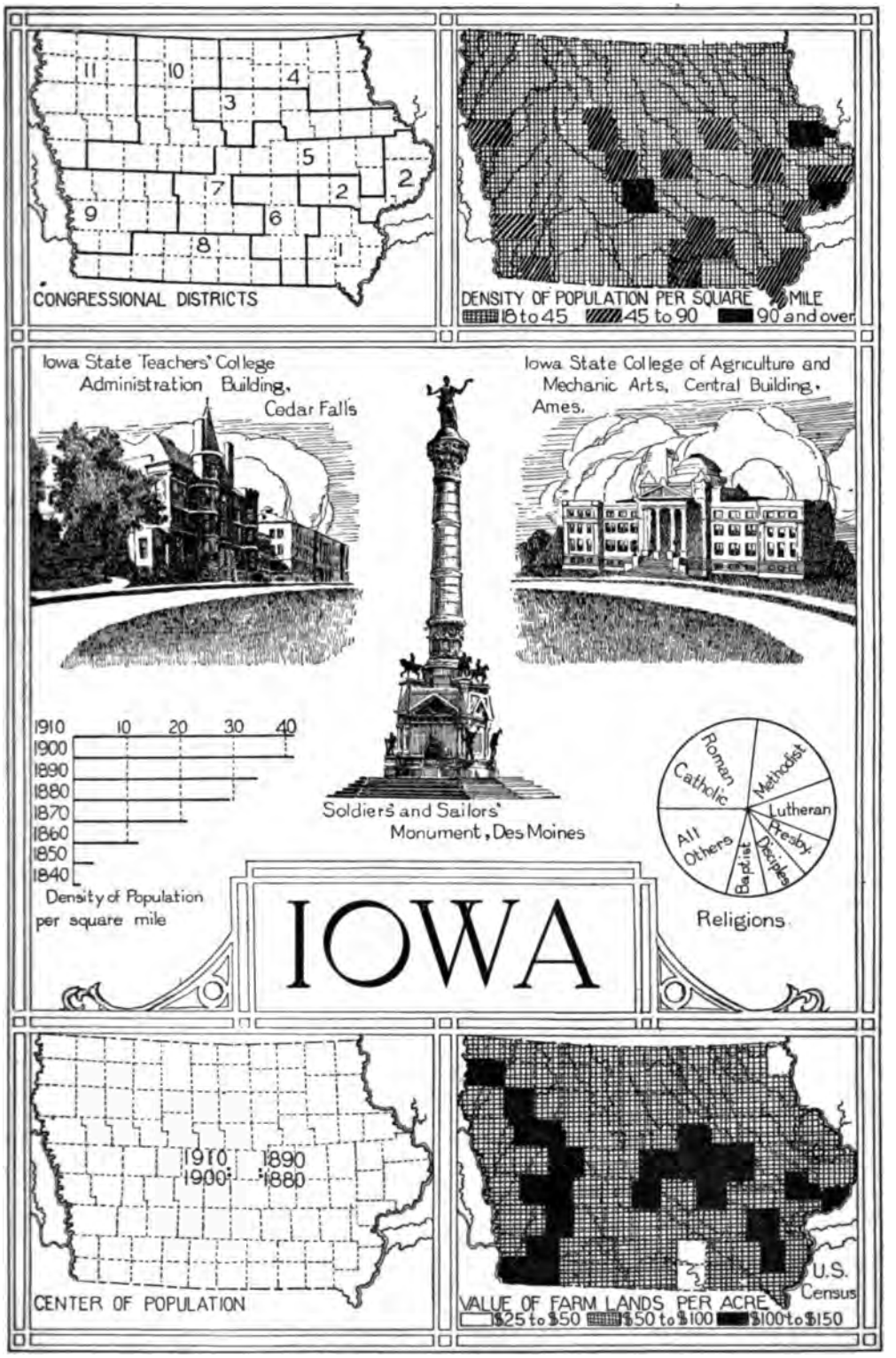
At the head of the judicial department is a supreme court consisting of a chief justice and six associate justices, each elected for a term of six years. Below this there are twenty-one district courts, each with from one to five judges elected for four years, and a number of superior courts, each with one judge chosen for four years. Such a court may be organized in any city having more than 4,000 inhabitants.

Charitable and Penal Institutions. At the head of these there is a Board of Control of State Institutions, which so far as possible is kept nonpartisan, and which has the power to investigate and to criticize all institutions, whether they be under state or private control. Special features of the correctional system are the indeterminate sentence, the nonpartisan board of parole and the possible suspension of first sentences in non-serious cases. A statute was passed providing for the sterilization by surgeons of the criminals, idiots, epileptics and drug fiends in state institutions, but the courts in 1914 pronounced this unconstitutional.

There are four hospitals for the insane, at Cherokee, Clarinda, Independence and Mount Pleasant; a hospital for inebriates at Knoxville and for feeble-minded children at Glenwood, and a school for the deaf at Council Bluffs. Charitable institutions for those not defective include the Soldiers' Orphans' Home at Davenport and the Soldiers' Home at Marshalltown, while the penal institutions are the state penitentiary at Fort Madison, a reformatory at Anamosa, an industrial school for boys at Eldora and one for girls at Mitchellville. At Oakdale there is a state sanatorium for the treatment of tuberculosis.

Brief History of Iowa. The state is surprisingly young for so thoroughly developed a commonwealth—much younger than its neighbors across the great river. The Indians from whom it takes its name lived in it but temporarily, and were driven out by the Sacs and Foxes, but it was the Iowa who were there at the time of the coming of the first white men, Marquette and Joliet, who in 1673 stopped in their voyage down the Mississippi long enough to land on Iowa soil near the mouth of the Des Moines River and take possession in the name of France. In 1680 came another Frenchman, Father Hennepin, but he made little attempt at exploration. Julien Dubuque, a French-Canadian, entering the state in 1788, obtained from the Sac and Fox Indians who had replaced the Iowa a grant of land at the present site of Dubuque; there he built a fort and trading-post, and opened up lead mines. When he died in 1810 the site was abandoned temporarily.

Meanwhile, in 1803, the whole region of Iowa as part of the Louisiana Purchase (which see) came into the possession of the United States, and was identified governmentally with the Territory of Louisiana. Gradually the Indians were induced to cede their rights to the land, and Iowa passed through its early years with fewer Indian troubles than beset Illinois or Indiana.


11
10
4
3
5
2
7
2
9
6
8
1
CONGRESSIONAL DISTRICTS
DENSITY OF POPULATION PER SQUARE MILE
6 to 45
45 to 90
90 and over
Iowa State Teachers' College
Administration Building,
Cedar Falls
Iowa State College of Agriculture and
Mechanic Arts, Central Building,
Ames.
1910
1900
1890
1880
1870
1860
1850
1840
10
20
30
40
Density of Population
per square mile
Soldiers' and Sailors'
Monument, Des Moines
Roman Catholic
Methodist
Lutheran
Presbyt.
Disciples
Baptist
All Others
Religions
IOWA
1910
1900
1890
1880
CENTER OF POPULATION
U.S. Census
VALUE OF FARM LANDS PER ACRE
$25 to $50
$50 to $100
$100 to $150

Years as a Territory. When Louisiana was made a state in 1812, Iowa became a part of Missouri Territory, and when Missouri was created in 1821, it formed part, in turn, of the territories of Michigan and of Wisconsin, and only on the admission of Wisconsin in 1838 was it organized as a separate Territory. In the meantime, pioneers had pressed into the state, attracted either by the lead mines or by the stretches of farm land; and Fort Madison, Burlington and Dubuque had been founded. By 1840 the territory had a population of more than 43,000, and the question of statehood came prominently to the fore. The measure was defeated in that year and again two years later, but in 1844 it was passed, and a constitutional convention was assembled. Even then progress was slow, for two constitutions were drawn up and rejected, and Congress caused delay because of the boundary question. Iowa in those days included much of the present state of Minnesota, but when it was finally admitted to the Union on December 28, 1846, it was restricted to its present boundaries.

Progress as a State. The year 1857 was a memorable one in the history of the new state. The constitution was revised, to confer upon negroes the right of suffrage; the capital was removed from Burlington to Des Moines, and there took place at Spirit Lake, in the northwestern part of the state, a brutal massacre of the white settlers by the Sioux Indians. It was feared that this disaster might frighten away immigrants, but it had no such effect, and the state progressed rapidly. There had been from the first no question as to the position of Iowa on the slavery question, and it did its full share to aid the northern cause during the War of Secession.

Immediately following the war, there came a period of rapid railway-building, and legislative questions relating to railroads became of ever-increasing importance. A board of commissioners whose duty was the standardizing of railway rates was created in 1873, as a result of a crusade against over-high charges undertaken by the Grange, but the question was far from settled by this legislation. The subject of prohibition, too, has been almost constantly before the public (see subhead *Government,* above).

From the date of its admission to the Union until 1854 Iowa was Democratic, but from the latter date it has been consistently Republican, only one Democratic governor holding office in all that time. In 1912 and in 1916 the state cast its vote for Wilson as President, bu elected a Republican governor each time.

Other Items of Interest. Many of the lak of Iowa are called *walled* lakes, because the are bordered by rock embankments which loo remarkably like man-made walls. The boulder forming these have been pushed up on th shore by water and ice.

Iowa was the first non-slave state to b formed of the Louisiana Purchase territory.

It is estimated that the soil of Iowa is worth as much as all the silver and gold mines i the world. Over large areas the rich blac soil is hundreds of feet deep.

Names reminiscent of the Indian occupatio are numerous. Of its ninety-nine counties about one-fourth have Indian names, and such town names as Pocahontas, Cherokee, Sioux City, Seneca and Muscatine clearly have a like origin.

Most of the states have a smaller wooded area now than when the first settlers entered them, but in Iowa the reverse is true. The forest area was originally very limited, but much attention has been given to the planting of trees of all kinds, and to-day fine groves are to be seen in many localities. A.MC C.

Consult Shaw's *Iowa,* in the American Commonwealth Series; Chandler's *Iowa and the Nation;* McFee's *Story of Iowa.*

Related Subjects. The following articles in these volumes contain much that is of interest in connection with a study of Iowa:

CITIES

Boone
Burlington
Cedar Rapids
Clinton
Council Bluffs
Davenport
Des Moines
Dubuque
Fort Dodge
Fort Madison
Iowa City
Keokuk
Marshalltown
Mason City
Muscatine
Oskaloosa
Ottumwa
Sioux City
Waterloo

HISTORY

Amana
Fox (Indians)
Grange
Iowa (Indians)
Louisiana Purchase
Sac
Sioux

PRODUCTS AND INDUSTRIES

Apple
Cattle
Corn
Dairying
Egg
Gypsum
Hay
Hog
Meat and Meat Packing
Oats
Poultry
Wheat

RIVERS

Mississippi
Missouri

RESEARCH QUESTIONS ON IOWA

(An outline suitable for Iowa will be found with the article "State.")

For what reason has the problem of education in Iowa been particularly difficult?

How does Iowa rank among the states as regards the value of its live stock? How many states have more hogs? More chickens?

Who were the first white men to visit the territory? Who was the first to live within its limits?

Of the states of the Union, how many surpass Iowa in the proportion of inhabitants able to read and write?

What could the traveler across Iowa discover as to its chief product? How does it rank among the states in the production of this crop?

Trace the course of the prohibition movement in this state.

What connection is there between the religious denominations of the state and the nationality of the foreign-born citizens?

What special advantages do the Iowa farmers have over those of many other states?

How is the debt-incurring power of the state limited? Mention several forms of progressive legislation that have been enacted.

What influence did an agricultural association have on the question of railway rates within this state?

Is the city or the country population increasing the more rapidly? What advantages has the Iowa farmer of to-day that the farmer of a generation ago did not have?

If the people of Iowa become dissatisfied with their constitution, how long will it be before they have an opportunity to change it?

Mention three events that made the year 1857 stand out in the history of Iowa.

What decided difference is there in the distribution of population in Iowa and that in Illinois?

What effect has the development of Canada had on the population statistics of Iowa?

What was the Glacial Period? What effect did it have on the surface features of this region?

How has the position of Iowa been of advantage to it as regards railway transportation? How many states have a greater railway mileage?

Of how many territories has Iowa formed, in turn, a part? When was it admitted to the Union?

What state is only 150 square miles smaller than Iowa?

Mention five names that recall the fact that this territory was once inhabited by the Indians.

How are the two greatest manufacturing industries connected with the agricultural production of the state?

How and when did this region come into the possession of the United States?

To what does the popular name of this state refer? How was the state flower chosen, and what is it?

How do the laws in connection with penal institutions prove the progressiveness of the state?

IOWA, a tribe of North American Indians, belonging to the Winnebago stock, who carried on an active fur trade in Minnesota after the whites settled in the country. Afterward they settled in the region a part of which to-day bears their name, and in 1836 they were given land on the west bank of the Missouri River, in what is now Kansas. At the time of the War of Secession they removed to reservations in Kansas and Oklahoma, where the remnant of the tribe, numbering about 220, now live. They were an agricultural people and given to hunting the buffalo. See INDIANS, AMERICAN.

IOWA, UNIVERSITY OF, a state institution, established in 1847 at Iowa City, then the capital of the state, the year after Iowa was admitted to the Union. Upon the removal of the seat of government to Des Moines, the old capitol building and the land on which it stood were given to the university, which was opened in 1855. From 1858 until 1860 only a normal department was in operation; the university was reorganized in 1860.

At the present time the university maintains a graduate college and colleges of liberal arts, law, medicine, homeopathic medicine, dentistry, pharmacy, applied science and education. It also includes two schools for nurses, a school of commerce and a school of music. The summer session embraces the Iowa Lakeside Laboratory at Lake Okoboji and a school for library training. Correspondence courses are under the direction of the extension division, which is organized in a series of bureaus. The university now occupies about thirty-five buildings, the majority of which are new, the principal ones being constructed of Bedford stone. Old Capitol, the corner stone of which was laid July 4, 1840, is the administration building, and stands at the center of a picturesque campus of fifty acres on the banks of the Iowa River. The quota of laboratories and museums is large; about 208,000 volumes are accessible in its libraries, including the state historical society library of 46,000 volumes.

The university is coeducational, and its control is vested in the Iowa state board of education. The total enrolment of students in 1915-16 was 3,286; the faculty numbered about 300 in that year. As contemplated in its organization, the university is an integral part of the public school system of the state, and its work is based upon the preparation afforded by the duly-accredited high schools of the state, whose students are admitted to the undergraduate and professional courses upon the presentation of proper certificates—except in the colleges of law and medicine, which require two years of collegiate work in preparation. Through the university the state undertakes to furnish instruction in the various branches requisite for a liberal or professional education. It also aims to encourage investigation and research, and to maintain in every particular a high standard and a progressive spirit. C.H.W.

IOWA CITY, IOWA, the county seat of Johnson County and the seat of Iowa State University. It had a population of 10,091 in 1910; by a Federal estimate in 1916 the number had increased to 11,413. The city is situated southeast of the geographical center of the state, on the Iowa River, twenty-eight miles south of Cedar Rapids, fifty-four miles northwest of Davenport and 121 miles east of Des Moines, the capital. Railway transportation is provided by the Chicago, Rock Island & Pacific and by two interurban lines, to Cedar Rapids and Muscatine. Iowa City was established in 1839 and was incorporated in 1853; from the time is was founded until 1857 it was the capital of Iowa, both as territory and state. The area exceeds five square miles.

Iowa City has a good location on a succession of three plateaus, which ascend 150 feet from the bank of the river. On the uppermost of these is built a handsome marble structure which was originally intended for the state capitol, and because of the resemblance of its site to that of the Acropolis of ancient Athens the city is locally called the *Athens of Iowa.* The building referred to is now the principal one occupied by the Iowa State University (see IOWA, UNIVERSITY OF). Iowa City is also the seat of the Iowa City Academy and the State Historical Society, the Ranney Memorial and the Carnegie libraries. It also has two high schools and a business college. There are two parks, City Park (eight acres) and College Hill Park; the university campus covers fifty acres.

Mercy Hospital is maintained in connection with the medical department of the university. Besides its educational interests, Iowa City is the farming trade center for several counties. Excellent water power is furnished by the Iowa River, and the industrial plants are numerous and varied; these include flour mills, knitting mills, glove, jewelry and perfume factories, brick and tile works, foundries, machine shops,

meat-packing plants and agricultural-implement works. The Johnson County Courthouse was constructed at a cost of $100,000. E.S.B.

IOWA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, one of the important American schools which emphasize technical and industrial training. It is a co-educational institution, and was established at Ames by the state legislature in 1858. In 1862, in accordance with an act of Congress making provision for agricultural and mechanic education throughout the country, the university came into possession of a valuable grant of public lands (see AGRICULTURE, subtitle *Agricultural Education*); seven years later it was opened for instruction.

The State College is exceptionally well equipped in facilities for agricultural training. Practical instruction in farming is given through the medium of a well-stocked farm of nearly 1,200 acres, while the Iowa Experiment Station, which is closely connected with the college work, gives opportunity for original investigation of problems dealing with agriculture. There are in addition departments of mechanical, civil, electrical and mining engineering, veterinary medicine, industrial and economic science and home economics, and a department which prepares students for the manufacturing industries. The college property is valued at $4,000,000, and its equipment includes a library of over 49,000 volumes. The faculty numbers about 435, and the student body, over 5,500. The work of the institution includes five lines, namely, agriculture, engineering, home economics, veterinary medicine and industrial science. It endeavors to serve the state by a correlation of educational, experimental and extension work.

IPECAC, *ip'e kak,* the dried root of a small, shrubby plant which is found in Brazil, from Bahia to Rio de Janeiro. There are three varieties, the brown, red and gray, all products of the same plant; the difference is occasioned by the age of the plant, place of growth, or mode of drying. *Emetine,* or the active principle of ipecac, is found in the bark of the root. It is a white, almost tasteless powder, without odor, which acts as a violent emetic in small doses, and is a powerful poison. In small and repeated doses, it stimulates the secreting organs of the bronchial mucous membrane and of the skin. In large doses it acts as an emetic, but with less violent symptoms. It should never be used except on the prescription of a physician. The root of the South American species is the only part that is recognized as ipecac by the British or the United States Pharmacopoeia. Modern medical science has successfully established the use of ipecac, or emetine, in the treatment of pyorrhoea, a disease marked by excessive shrinkage or receding of the gums.

IPHIGENIA, *if e je ni'a,* the heroine of several Greek legends, a favorite subject with painters, sculptors and poets. Her interesting story has been immortalized by two tragedies by Euripides and a play by Schiller; in music, by Gluck; in poetry, by Goethe and Racine. Agamemnon, king of Argos, incurred the wrath of Artemis (Diana) by killing a hind sacred to her. In revenge she prevented the Greek fleet from sailing to Troy, and would only be appeased upon the condition that Agamemnon sacrifice to her his daughter, Iphigenia. When Iphigenia was brought to the altar she disappeared and a hind lay there in her stead. Artemis carried her off in a cloud to Tauris, where, acting as the priestess of the goddess of the chase, she sacrificed all strangers in honor of her mistress. In the course of time Orestes, Iphigenia's brother, came there in search of her, but just as she was about to sacrifice him, a happy recognition took place. Orestes then took her, together with the sacred wooden image of Artemis, to Attica. See MYTHOLOGY.

IRAN, *e rahn',* the name given to the kingdom of Persia when it embraced the land between the Hindu Kush Mountains, the Tigris River and the Persian Gulf. The wide extent of this old country showed a great variation in climate and presented wide diversity in features as well as in traits and customs of its people. In the old stories relating to Persia, *Turan* was the land of darkness, and was the name applied to the regions of Asia inhabited by tribes coming from Tartary, while *Iran* was the land of light. The latter name was adopted by the early inhabitants who belonged to the Iranian branch of the Aryan family of nations.

Iranians, the name applied to peoples speaking languages handed down from the Aryans, the chief stock being the Persians, the Hajemis of the Ispahan country, the Parsis, the old Bactrians and the Kurds. The early authorities frequently classed the Iranians with the Armenians, who were natives of the Caucasus Mountains. From earliest history the Iranians were devoted to commerce, and they spread Persian influence as far north as Siberia and even to China. The greater number of the Iranians are Mohammedans.

Iranian Languages. The range of Iranian culture was extensive. The two oldest known languages are the old Persian of cuneiform inscriptions (which see), and the old Bactrian, of Zend, from which came the Zend-Avesta, as the sacred book of the Parsees was called. The middle Iranian period extends to about the tenth century of Christian civilization. The modern Iranian languages are written in Arabic script, and the dialects of the Kurds form numerous branches of the Iranian language.

IRELAND, the EMERALD ISLE of millions of loyal Irish, who, whether they still live within its borders or have found other homes across the seas, look upon the island as the fairest spot under heaven. Politically it is the smaller member of the United Kingdom of Great Britain and Ireland; geographically, a large island to the west of Great Britain. Twice, at least, during the geologic ages it was a part of Great Britain and of the land mass of Europe.

Though long united politically more or less closely with England, Ireland has preserved a very distinct identity. The emerald green which is its national color and the golden harp with silver strings, which is its coat of arms and the ornament of its flag, are more universally known than almost any other national symbols, while the shamrock, its flower, is seldom mentioned or thought of except in connection with Ireland:

"There's a dear little plant that grows in our isle—
'Twas Saint Patrick himself sure that set it;
And the sun on his labors with pleasure did smile,
And with dew from his eye often wet it.
It shines through the bog, through the marsh and the mireland,
And he called it the dear little shamrock of Ireland."

Size and Position. Among the islands of the world Ireland is sixteenth in size, having an area of 32,596 square miles. That is, this island with its strongly individual population and its important place in the eyes of historians is a little smaller than the state of Maine. Its greatest dimension is the diagonal 302 miles long from Mizen Head in the southwest to Torr Head in the northeast, and its greatest breadth is 174 miles.

Ireland lies between parallels 51° 26′ and 55° 21′ north, and is thus in approximately the same latitude as Southern Labrador, Canada, but conditions of climate are so different that no one visiting the two places would imagine them to be in similar positions (see subhead *Climate,* below). Between Ireland and Great Britain there are three bodies of water, Saint George's Channel, the Irish Sea and North Channel, this last-named at its narrowest point but thirteen and one-half miles in width. On all other sides is the open Atlantic.

The People. There are certain qualities which stand out as characteristic of the Irish. "Witty as an Irishman" is an expression which has a sound basis in the quickness, the peculiar mental slant which enables them to catch the humorous point of view and to express it in most telling phrase. The homely speech of the peasant class abounds in words and phrases which have an especial aptness and charm, and the writers who have taken as their field the common everyday life of Ireland have found in this peasant-language a rich mine. The Irish are a most kindly people, too, and industrious, and in the countries to which they have emigrated many have become useful and leading citizens. They are in general of a more cheerful temperament than the English or Scotch, and seem to have something comparable to the traits of the laughter-loving people of France; however, for the poorer classes life has been so hard for generation after generation that a certain hopelessness has established itself as a part of the national character.

The mass of the Irish people are descendants of a Celtic race, the relationship of which to the Celts of Great Britain is not understood (see CELTS). The early invaders of different races, whether from England, Scandinavia or the Mediterranean countries, were absorbed into the original stock without changing its character, though the Celtic tongue gradually sank into the background. The English and Scotch who came later, however, and settled in the northeastern part of the island, were never assimilated, difference in religion rather than in race—for the newcomers were Protestants—emphasizing the division; and until the present day the friction between the two factions has not disappeared. English is the dominant tongue, and there are in the entire island fewer than 600,000 who can speak Irish, and not more than 17,000 who speak Irish only. During the early part of the twentieth century enthusiastic scholars put on foot a movement for reviving the use of the Irish tongue, and classes have been established in many schools.

The population of Ireland shows a very interesting line of growth and decrease. In 1770 there were about 2,500,000 people in the island, but shortly after that the population began to increase rapidly. Economic conditions were better, and a very satisfactory foodstuff, the potato, had been found which would grow easily and was palatable as well as nutritious, and the supporting power of the land began to be taxed to the utmost. In 1821, when the first official census was taken, the population was 6,800,000; twenty years later it reached 8,196,000—the high-water mark. A potato famine in 1845 brought death to many, and was the cause of the first extensive emigration of Irish to other lands—an emigration which has continued ever since. Between 1847 and 1852 more than 1,000,000 went to the United States, which has remained the most popular foster-country for the Irish. Every census-taking reveals a decline in population, but in 1911, with its population of 4,390,219, Ireland still had 135 people to the square mile—a density more than four times as great as that of the United States as a whole. Over two-thirds of the people live under rural conditions, but the number of dwellers in cities or towns of 2,000 or more is increasing at the expense of the rural element. There are eight cities with a population greater than 25,000; two of them are suburbs of Dublin; the others are Belfast; Dublin, the capital; Cork, Londonderry, Limerick and Waterford.

Irregularities of Coast and Surface. A very old historian writes of Ireland that this island "lying a-loose upon the Western Ocean in shape resembleth an egg, plain on the sides, and not reaching forth to the sea in nooks and elbows of land as Brittaine doeth;" but a glance at the map will show his error. On the east, probably the only shore known to this early writer, there are, it is true, long stretches of fairly straight coast, but the western outline is bold and rugged, marked with numerous indentations. These are fiords, or drowned valleys, like those of Norway, and here and there along the coast are rocky islets, the projecting peaks of mountains long ago submerged. This western coast of Ireland, with its hills running down to the sea, has of late years been much visited by tourists, and occasional resort-towns have sprung up. The total coast line of the island is almost 3,000 miles.

COMPARATIVE AREAS
Maine has 33,040 square miles; Ireland, 32,596 square miles.

Though it is in the west that the mountains approach the sea most closely, it is true of the island in general that the highlands follow the coast. This does not mean that there is a continuous ridge, for Ireland has no such thing as a mountain range; but most of the isolated masses are plainly visible from the sea. At places in the northwestern counties cliffs of solid rock 2,000 feet in height rise sheer from the water, an awe-inspiring sight to the sea-voyager. As in England, the highest mountain peak, Carrantuohill, 3,414 feet in height, is in the picturesque lake region.

Within the walling mountains is the central plain of which the bogs, the most characteristic physical feature of Ireland, make up a large part. Dreary, brown, totally unfitted for cultivation, this bogland is not harmful as are many damp, swamp regions, for no fever-breathing vapors rise from it. It supplies the Irish people, too, with much of their fuel, for from it are cut the blocks of peat—vegetable matter submerged for a long time, but not long enough to become coal. See PEAT.

The Waters of Ireland. From the central plain rivers flow in all directions to the sea, finding their way through the gaps in the marginal highlands. No dominating mountain mass forms a watershed, and the rivers have often winding, tortuous courses. Many of them widen into series of lakes, notably the Shannon, the longest river in the British Isles. This drains the central part of the plain, and is navigable for much of its course of 250 miles. Other rivers of importance are the Boyne, near which was fought a memorable battle; the Erne, another river with chains of lakes in its course; the Lee, which forms with its estuary the harbor of Cork; the Blackwater, a bog-fed river which well deserves its name; the Slaney and the Barrow. Many of these streams, and other smaller ones, are important means of intercommunication, even in these days of extensive railroads.

The lakes of Ireland, or *loughs,* as the Irish call them, are very numerous and, in proportion to the size of the island, of considerable extent. Lake Neagh, in the northeast, is the largest lake in the British Isles, having an area of 158 square miles; but the lakes of Killarney, in the southwest, are the most famous, because of the exquisite beauty of their surroundings. In the central plains the innumerable lakes have little beauty, being but sluggish pools dark with peat, but they are favorite haunts of fishermen, for trout are thick in their shadowy waters, and fish furnish no inconsiderable portion of the food of the people in many localities.

Climate, and Plant and Animal Life. It is the Atlantic Ocean which has most to do in determining the climate of Ireland. From it blow those westerly and southwesterly moderately mild winds which prevent extremes of temperature, making the average for the winter from twenty to thirty degrees higher than it is in the same latitude in North America or Eastern Europe, and that for the summer from five to ten degrees lower. The mean temperature for the year is about 50°, that for the winter being 40° and that for the summer 60°. Rainfall is everywhere plentiful, and to this is due the brilliant green of the foliage which gave rise to the name of the "Emerald Isle." Somewhat more rain falls on the outer slopes of the western mountains than elsewhere, but in general the amount is fairly uniform, averaging about forty inches.

The vegetation of Ireland presents few distinctive features save its vivid greenness, practically all of its plants being related to those of England and the nearby continent, and the same is true of the animal life. Time was when great deer, bears, wolves and wildcats roamed the forests, but the forests have been cut down and the animals exterminated. One lack there is in the animal life which must be noted—there are no snakes in Ireland. Saint Patrick drove them into the sea, says the popular tradition, but scientists find nothing strange in the absence of snakes, since Scotland has none either, and England has but two species.

Resources and Industries

Minerals. A country which has not an adequate supply of coal is seriously hampered in its industrial development, and in this position Ireland finds itself. Coal measures exist in almost every province, some of them of considerable area, but much of the coal is of so inferior a quality that it scarcely pays for mining. Usually the total yield of the mines is under 100,000 tons a year, and fewer than 800 people are employed in them. This lack of coal is especially to be regretted, since Ireland has extensive deposits of iron ore which cannot be utilized because of the absence of fuel. The output of other minerals is of no importance save for marble and other stones.

Manufactures. Naturally enough, with this lack of fuel, manufactures have not flourished in Ireland, and the measures forced upon the island by England during their earlier connection made conditions still more unfavorable. The Irish would laboriously build up an industry—silk or woolen manufacture, for instance—only to be cut off by British navigation acts from its markets. To-day the chief manufactured product is linen, which is of a whiter, more delicate texture than that made elsewhere. The linen and allied industries center in Ulster, and especially in Belfast, and their total products amount in a year to about $75,000,000. Belfast is also the center of the Irish shipbuilding industry, and its annual production equals if it does not surpass that of any other yard in the world. Other industries of importance are brewing and distilling, rapidly taking rank at the head of the list; also woolen manufacture, and such home-pursuits as lace-making and embroidery, for which certain sections are famous.

Fisheries. These form a natural resource of the greatest importance, but of late years the fullest advantage has not been taken of them, fully a third fewer men and boats being engaged in the business in 1916 than in 1890. Dried fish are even imported in considerable quantities. The government has done its best in recent years to revive the industry, seeing in it hope for many of the poor who cannot wrest a living from the soil. The total annual catch is between $1,500,000 and $2,000,000 worth, salmon being by all means the most important single catch.

Agriculture. This is, and always has been, by far the most important industry in Ireland, and according to agricultural conditions the prosperity of the island has fluctuated. The natural advantages are considerable, for there are large stretches of cultivable land, with a deep, rich soil, and the climate is favorable to most temperate-region crops. But of these advantages the Irish people have not always been allowed to reap the benefit. Centuries ago much of the best land was parceled out in large estates among the conquering English, frequently non-residents, and by them it was rented on oppressive terms to Irish tenants. Much of the soil was soon over-cultivated, and so became exhausted. But in recent years conditions have decidedly improved. Large tracts of land were withdrawn from tillage and given over to pasturage, for which purpose its rich growth of grass peculiarly fits it.

A great improvement was made, too, by the establishment of a department of agriculture. This body, which came into being in 1899, has as its objects experiments as to the best location and methods for certain crops; the instruction of the people, especially the young men and women, on agricultural subjects; and the betterment of live stock. See, also, subhead *Congested Districts Board,* page 3049.

To-day the largest acreage is devoted to oats, and the next to potatoes, the chief food crop. Wheat, once a crop of great importance, has now sunk to minor rank, but barley is still grown in large quantities, and in the north, near the linen-making district, there are broad fields of flax. Vegetables and small fruits make up a considerable acreage, and hay is cut in certain sections.

As indicated above, stock raising is of ever-increasing importance. Indeed, there are to-day in Ireland more head of cattle in proportion to area than in any other country of Europe, with the possible exception of Denmark. The young cattle are exported in great numbers to England, and are there fattened for market. There are almost as many sheep in the island as cattle, but there are less than one-third as many pigs, though that animal has long been considered the Irishman's particular property. Excellent horses are also grown in Ireland, both of the cart-horse and of the hunter type, and there was a great demand for them at the outbreak of the War of the Nations in 1914.

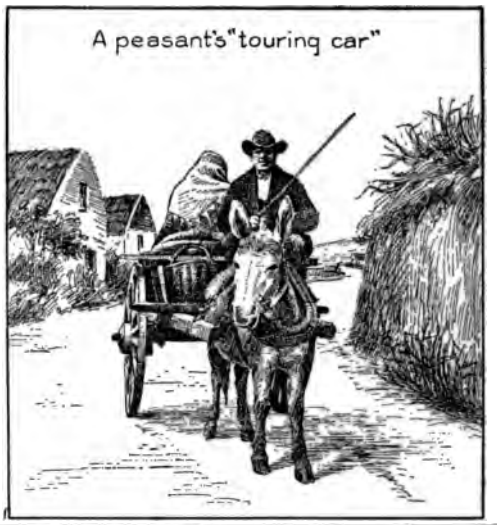
Transportation and Trade. The rivers and canals which served for transportation before the extensive building of railways began have not been allowed to fall into disuse, and are to-day of the greatest importance. The capital city of Dublin is connected by canals with the Shannon, and shorter canals join practically all of the important streams. There is also an excellent system of railways, or rather, a number of small connecting systems, for the abundance of short lines is one of the characteristics of railroad transportation in Ireland. The total number of miles of railway in the island is 3,403, over a thousand more than that possessed by Maine, the state which it most resembles in size.

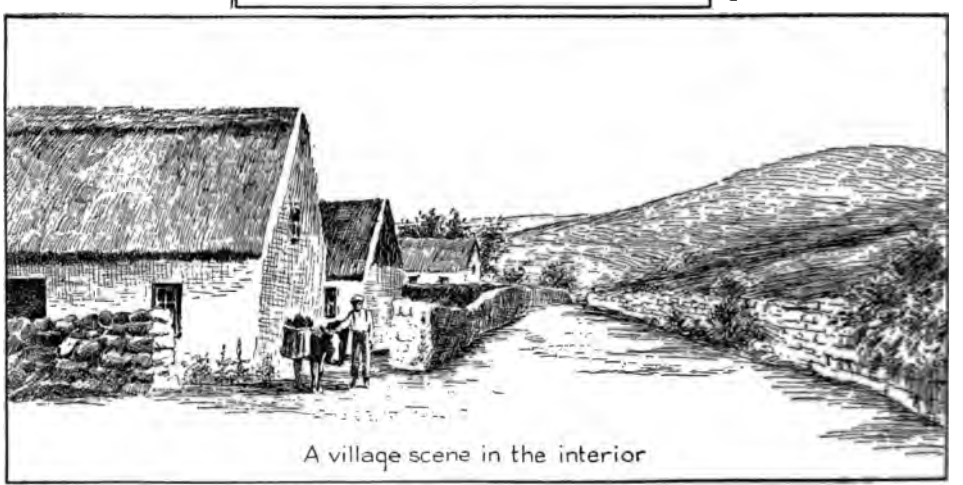
Several steamer lines, from Belfast, Dublin, Waterford and Cork, connect Ireland with Great Britain, and American steamers make Queenstown an important port of call. The commerce of Ireland is considerable, the imports and the exports each totaling more than $300,000,000 a year, the former exceeding the latter by about $25,000,000. Most of the exports, which consist largely of live stock, linens, liquors, meat products and dairy products, are sent to Great Britain, but other countries, including the United States, send to Ireland vast quantities of farm products. Belfast has the largest trade.

Political and Social Conditions

Government. After 1800, the year of the Act of Union (see subtitle *History* below), Ireland was an integral part of Great Britain, and had no Parliament of its own. It sent, instead, 103 representatives to the British House of Commons and twenty-eight peers, elected for life, to the House of Lords. Never at any time were the Irish satisfied with such

complete amalgamation with England and the agitation for Home Rule was kept up with varying intensity. In 1914, after years of struggle, a Home Rule Bill was actually passed, but it was not received with enthusiasm by the Irish Protestants of Ulster, and violent dissension was the result. The outbreak of the War of the Nations in that year quelled the disturbance and united Ireland in defense of Britain, but it also made necessary


A peasant's "touring car"


A village scene in the interior

a postponement of the actual Home Rule arrangements. In 1917 a plan was offered, but the terms of settlement were not satisfactory, and the matter was dropped again, pending further discussion.

The chief executive official of Ireland is a Lord Lieutenant, or Viceroy, who is the representative of the Crown. As his advisers he has a privy council (which see). Most of the actual work of governing, however, falls on the chief

An important household art, even to-day

secretary for Ireland, who is usually a member of the British Cabinet and always of the House of Commons.

As in England, the highest court of appeal is the House of Lords. The chief court with original jurisdiction, however, is the High Court of Judicature, and there are other courts with special jurisdiction. The police force in Ireland is not a municipal but a government institution, united under one inspector-general and known as the Royal Irish Constabulary.

Previous to 1898 local government in Ireland was complex and unsystematic, but in that year there was passed an Irish Local Government Act which greatly simplified conditions. In each of the thirty-two counties with which the four ancient provinces of Leinster, Munster, Connaught and Ulster are divided, the chief authority was placed in the hands of a popularly elected council, and

the larger cities were also erected into county boroughs, with similar councils.

Religion. Though the Irish did not embrace the doctrines of the Reformation as generally as did the English, an established Irish Church was forced on them with the Act of Union in 1800, and they were compelled to contribute to its support. Even after the political disabilities were removed from the Catholics in 1829, the Irish Church continued to be a drain on them, and not until 1871 was it finally disestablished. To-day, therefore, there is no state Church in Ireland, but about seventy-four per cent of the population belongs to the Roman Catholic Church. In Ulster there are large numbers of Episcopalians and Presbyterians, the descendants of Englishmen and Scotchmen who settled there long ago, and the Methodist Church also has a considerable following in the northern counties. Indeed, in Ulster the adherents of these three Protestant Churches combined decidedly outnumber the Catholics. With the decrease in population (see subhead *People* above) it has been the Catholics who show the greatest loss, for far more of them emigrate than do the Protestants.

Education. The religious question has made difficult the establishment of any system of education for Ireland. The tendency of the British government was to make all schools Protestant in tone, and naturally the Catholics would not allow their children to attend such schools. An attempt was made to remove the difficulties by having the secular teaching of Catholic and Protestant children conducted together, while religious instruction was imparted separately, but this did not prove satisfactory, and to-day the children are in a measure segregated—Catholic children are taught by Catholic teachers, Protestant children by Protestants. The system is strongly centralized, a board of commissioners having almost absolute control. This board even supplies the textbooks, for fear religious questions may be brought into the secular teaching if the teachers are allowed to select the books. Though the compulsory education law, which has been in existence since 1892, is not well enforced, illiteracy is decreasing steadily in Ireland, and the percentage of those who can neither read nor write is now about nine. There are no state secondary schools, but the government lends aid to those of whatever sect which have proved their worth.

Among higher institutions may be mentioned Trinity College, Dublin, a famous university which dates from 1591; and the so-called Queen's Colleges of Belfast, Cork and Galway, all three coeducational institutions. At the head of the system is the National University, but this is not a university in the ordinary sense of the term, being merely an examining and degree-conferring body.

Literature. See IRISH LITERATURE.

The Congested Districts Board. This is an institution which deserves special mention. In Western Ireland some of the counties had become painfully overcrowded, chiefly because poor tenants evicted from their little holdings in the more fertile districts had settled here in great numbers. A whole family would be trying, by the most unenlightened of methods, to wrest a living from the exhausted and stony soil, and the result was widespread suffering. At harvest time there was a regular migration of these people to England and Scotland, where they worked in the fields. The Congested Districts Board, created in 1891, has as its function the bettering of conditions in these regions. Some families are induced to move, others are given larger holdings, and everywhere better agricultural methods are introduced. Some of the people, too, have had their attention turned from the stubborn soil to the abundant fisheries of the coast. Over $1,000,000 is expended annually by this board, and the results have fully justified the outlay.

History of Ireland

The Very Olden Times. An Irish historian, attempting to establish for his country great antiquity, is willing to concede that "It seems to be certain that Ireland continued uninhabited from the Creation to the Deluge." No man can say who the first inhabitants of the island were, nor when they lived. Native legends tell of several tribes who came and went, driven out before stronger invaders; and, centuries before Christ, Greek and Roman writers referred to the island of Ierne, or *Hibernia*. But the dawn of authentic history came in the fourth century A. D. The lords of Ireland in that day were the Scoti, a Celtic tribe who were strong enough to make raids on Britain, then under Roman rule, and even to cross the Channel to Gaul. Wonderful indeed were the doings credited by later writers to some of

these old Celtic heroes, Finn, or Fingal, especially having the wildest of legends woven about his name.

Barbarians these early people were, but not in the sense of the earliest inhabitants, who knew not the use of metal or even of fire; for the Scoti possessed the rudiments of agriculture and had definite systems of government and religion. Each of the numerous provinces had its king, and all these were in a measure subject to the king of the central province, Meath; and each clan had its chief. At the head of the religious system were the Druids, those priests about whose name so much mystery hovers.

The First Great Event. This was not a war, but the coming of an unarmed priest who to-day is Ireland's patron saint—Saint Patrick. About 432, it is believed, he came to the island, and despite obstacles did a work little short of miraculous in spreading among a pagan population the doctrines of Christianity. The Irish did not become mere passive converts. They were swept by a passion for missionary labor, and from their newly established monasteries missionaries in great numbers went out to Britain and to the Continent, and did a wonderful work. Students, too, thronged to Ireland and sought education in its monasteries, and for a time, as one historian says, "The new religious houses looked for their ecclesiastical traditions not to Rome but to Ireland." At no subsequent time has Ireland played so great a part in the history of the world.

The Coming of Invaders. This religious progress, which seems to have been attended by little of secular progress save in the art of music, met a rude check in the last decade of the eighth century in the coming of the black Viking ships, with their hordes of Danes and Norsemen. The Scandinavian tribes established themselves on the coast, building or occupying Cork, Waterford, Limerick and Dublin, and took to ravaging the country, finding particular delight in plundering the monasteries. It is probable that the famous round towers of Ireland were built in the eighth and ninth centuries and were used as defenses against these fierce invaders. For more than two centuries the Danes harassed the island, but in 1014 were overthrown by a celebrated hero, Brian Boroimhe, more commonly known as Brian Boru. Brian had brought almost all of the island under his rule, but he fell in the very moment of his victory and the island slipped back into anarchy again. Says an old rhyme:

> Each man ruled his own tribe,
> But no man ruled Erin.

For more than a century and a half this state of things continued, with scarcely a gleam of light in the darkness and misery; and then came the English, and a new phase in Ireland's history began. Pope Hadrian IV had given Henry II of England permission to subdue the island, and when Dermod Macmurrough, a deposed Irish king, took refuge at the English court and asked aid, Henry allowed him to call for volunteers among the English. The leader of these volunteers was Richard, Earl of Pembroke, best known as "Strongbow," who placed Dermod again on his throne, married his daughter and later succeeded him. Other Norman nobles settled in the island, and when in 1172 Henry II landed at Waterford, he was greeted as "lord of Ireland."

Relation of the Two Islands. The Norman nobles and their followers received from the king great grants of land, and after they had put down the opposition of the natives they allied themselves with them and began to defy the power of the king. Adopting the customs and language of the natives, they became more Irish than English, and the hold of England on the island grew weaker. In time only the region about Dublin—the "Pale" as it was called—felt the English influence. Under Henry VII, a strong king, there was a change. Sir Edward Poynings, a man with English interests at heart, was placed in charge, and he put through several measures looking toward the strengthening of English control, most important of which was the law which made the Irish Parliament dependent on the king. It must not be forgotten that throughout all this time the mass of the Irish people was scarcely civilized, and could hardly be expected to understand and appreciate English laws and customs.

Henry VIII was for the most part very wise in his dealings with Ireland. He provided that Irish law and not English should be enforced in the untamed districts outside of the Pale, and he allowed representatives from these regions to become members of Parliament. It was this mixed Parliament which in 1541 conferred on him the title of King of Ireland. But to the religion of the island Henry was not so kindly. In his attempt to enforce the reformed faith which had been introduced in England, he had the monasteries destroyed

and their wealth confiscated, purchasing the good will of the Irish chiefs by sharing these riches with them. The Protestant Edward VI and the Catholic Mary in turn pressed their faiths on Ireland, which felt these changes of religion very little, however, and Elizabeth when she came to the throne planned for the island some such wise policy as her father had pursued. But a rebellion headed by the Irish chieftain, Shayne O'Neill, had to be put down with violence, and thereafter Elizabeth did not return to her conciliatory policy. The whole island suffered. Villages were plundered and burned, crops destroyed, cattle and even people were put to death in great numbers, and before the close of the struggle it is estimated that at least one-third of the inhabitants had perished. The lands were distributed among English nobles, and Ireland entered upon a distinctively English period. The Anglican Church, hated by practically all the people except the English of the Pale, was made the established Church, as in England, and Catholics were denied all rights and excluded from all public offices.

Increasing Disaffection. Under James I and Charles I the confiscation of land and the suppression of the Catholics went on, and the colonization of Ulster by the Scotch, so strong a factor in present-day Irish history, was begun. Charles's viceroy, the Earl of Strafford, by his policy of "thorough" reduced the land to order, but when his strong hand was removed a rebellion broke out, in which the greatest atrocities were committed on both sides. The Irish might have made a substantial change in their condition had they known how to make the most of their successes, but dissensions broke out among them of which the English were not slow to take advantage. Not until Cromwell was sent over with his "New Model" army in 1649, however, was the island really reduced. New confiscations of land took place, and more and more English became landowners in Ireland. This gave rise to a strange condition. By all means the majority of the people were Catholic, but almost nine-tenths of the land was held by Protestants. Indeed, by laws passed shortly after this time, a Catholic was made incapable of acquiring land, as he was already of holding any sort of public office.

When James II, a Catholic, became king of England, he favored the Catholics in Ireland, and as a result found enthusiastic supporters when, after his deposition by William and Mary, he went to the island. In 1690 there took place the Battle of the Boyne, in which James was completely defeated, and by the next year Ireland was again completely subdued. According to the terms of the treaty, Irish Catholics were to regain possession of much of their land and were to be allowed, in a measure at least, religious liberty. But the Parliament of England and that of Ireland, of which the English Protestants were in control, refused to abide by these terms, and the cruel laws that were passed crushed the infant industries of the island and forced many of the better class of the inhabitants to emigrate. This first half of the eighteenth century is the darkest period of Irish history.

The Struggle for Better Conditions. Naturally the Irish did not accept these conditions tamely, and frequent insurrections resulted. Finally, in 1778, the Irish Parliament by a Relief Act lifted a little of the crushing weight, giving to Catholics the right to hold land and to practice their religion. The Irish Protestants joined with the Catholics in a demand for legislative freedom, and as they backed their demand with an armed force and had at their head the patriot Grattan, they gained their point, and in 1782 the Irish Parliament was declared independent. The methods of gaining seats in this Parliament, however, were in sore need of reform. Moreover, it was composed entirely of Protestants.

In 1798 the Irish again revolted, stirred by the excitement of the revolution in France. The rising was put down, but it had made clear to the English that Ireland in its present condition could be nothing but a hotbed of insurrection. William Pitt, Premier of England, thought he saw the way out of the difficulty, and proposed a legislative union of the two countries, and the emancipation of the Catholics. The Act of Union passed both Parliaments, and on January 1, 1801, "The United Kingdom of Great Britain and Ireland" was proclaimed.

Early Years of the Union. Catholic emancipation did not follow, and the Irish, little pleased with the union with Great Britain, were rendered still more dissatisfied. The struggle for freedom, religious and political, which began then did not approach settlement until the second decade of the twentieth century. The first rising that took place attracted considerable attention because of the picturesque character of its leader, Robert Emmet, but it accomplished nothing. The

main contention in these early years was for Catholic emancipation, and the chief leader was the able and patriotic Daniel O'Connell. In 1829 the government found itself unable to resist further, and Catholics were given the right to hold office and to sit in Parliament. They were still forced to pay tithes to the established, or Anglican, Church, which the Catholics hated bitterly, and not until 1871 was disestablishment brought about.

The reforms of 1832 in England helped Ireland a little, but not enough to quell the demands for Home Rule, and about 1841 open insurrection was narrowly averted. Between 1845 and 1847 the suffering of Ireland came to a climax. The potato crop failed; upon this the poorer people depended almost entirely, and famine resulted. Thousands died, hundreds of thousands emigrated, and the population of the island has never recovered from this loss. Gradually the English leaders came to look with greater favor on the pleas of Ireland, and certain reforms were carried out in the land laws which relieved the distress, and agricultural and industrial conditions improved decidedly; but it was something more thorough-going that the Irish were fighting for, and the struggle for Home Rule became more and more intense.

Later Phases of the Home Rule Question. It is the Home Rule question which has dominated Irish political history through the last half-century. In 1886 Gladstone became Prime Minister of England, and at once introduced a bill providing for legislative independence, or as it is more commonly called, Home Rule. This was rejected, as was another which he brought forward seven years later. Other acts for the advancement of Ireland, however, were more successful. The establishment of a department of agriculture; the Local Government Act of 1898, and above all the Land Purchase Bill of 1903, which declared that tenants might purchase their holdings from the great landlords, worked decided and lasting changes, but still did not satisfy. In 1912 a third Home Rule Bill, officially known as the Government of Ireland Bill, was introduced by Premier Asquith, with the effect of stirring up immediate protest in the Irish province of Ulster. For the Protestant population of that province did not desire Home Rule, preferring rather "equal citizenship in the United Kingdom" than rule by the Catholic majority.

Twice the Home Rule Bill passed the House of Commons and was rejected by the Lords, but on its third passage by the House in 1914 it became a law according to the Parliament Bill of 1911 which allows the lower house to pass a bill despite the continued disapproval of the upper (see GREAT BRITAIN, subtitle *Government*). But the excitement was by no means allayed, for the Ulster Unionists refused to be bound by the terms of the bill, and various amendments were introduced excluding Ulster from the jurisdiction of the new Irish Parliament. But Ulster is not all Protestant, and its Catholic inhabitants were enthusiastic Home-Rulers. It seemed as if nothing could avert civil war, but the outbreak of the great War of the Nations in August, 1914, brought about an immediate truce. The two parties, Unionists and Nationalists, vied with each other in their offers of assistance to England. The actual execution of the new measure was suspended until "such later date (not being later than the end of the war) as may be fixed by his Majesty by Order in Council." In 1916 a temporary plan of Home Rule was proposed, to be operative for a year after the end of the war, but it was rejected. Again in March, 1917, a crisis threatened, which was so serious that a council of the empire was proposed to deal with it.

The War of the Nations. Upon the outbreak of the War of the Nations, it is said that Germany believed Great Britain would not be drawn into the conflict because it would face revolt and civil war in Ireland over the exciting Home-Rule campaign. The diplomatists of Germany doubtless counted upon England's internal troubles to keep that great power neutral, but such conclusions were quickly shattered. When Britain was put in peril the Irish dropped their political differences and thousands of volunteers joined the armies destined for service in France, Belgium, Egypt, Asia Minor and the Balkan Peninsula. In 1916, when conscription was ordered, Ireland was excluded from the provisions of the act, for the island's leaders in Parliament convinced the government of the wisdom of such exception. In April of the same year, a rebellion, led by armed members of the Sinn Fein Society (see SINN FEIN), broke out in Dublin, but it was promptly quelled by the British authorities. Over 500 people were killed in the course of the rebellion and several million dollars' worth of property destroyed. Sir Roger Casement, the chief leader of the uprising, and several of his confederates were found guilty of treason and were executed. E.M.T.

OUTLINE AND QUESTIONS ON IRELAND

Outline

I. Location and Size

(1) Latitude
(2) Longitude
(3) Position with reference to Great Britain
(4) Size

II. Physical Features

(1) Coast
(2) Surface characteristics
  (a) The coastal highlands
  (b) The central plain
(3) Rivers and lakes
(4) Climatic features
  (a) Dependence on surrounding waters

III. Industries

(1) Agriculture—the chief industry
  (a) System of land tenure
  (b) Department of agriculture
  (c) Chief crops
  (d) Stock raising
(2) Mining
(3) Manufacturing
(4) Fishing

IV. Commerce and Transportation

(1) Steamship lines
(2) Exports and imports
(3) Chief countries traded with
(4) Rivers, canals and railways

V. The People

(1) National characteristics
(2) Population statistics
(3) Social conditions
  (a) Education
  (b) Religion
  (c) "Congested Districts Board"

VI. History and Government

(1) The beginnings
(2) Coming of Christianity
(3) Foreign interference
(4) The long struggle with England
(5) The Act of Union
(6) The modern Home Rule question

Questions

What manufactured product does Ireland make in greater perfection than any other country?

What was the "first great event" in the history of the island?

Why do scientists not consider it strange that Ireland has no snakes?

Who were the Druids, and what did they have to do with Ireland?

What does *Sinn Fein* mean? What part did an organization bearing that name play in the history of Ireland?

What distinction has Ireland as to the length of its longest river and the size of its largest lake?

Why was a Congested Districts Board necessary? What does it do?

Why did not all Ireland welcome Home Rule?

From the map, show the error of an early chronicler in describing the shape of Ireland.

How has the religious question interfered with the progress of education in Ireland?

How many states of the American Union have a larger population than Ireland? How many are more densely populated?

What is meant by the "disestablishment" of a Church? When was the English Church disestablished in Ireland?

For what is the Boyne River famous?

What people of continental Europe do some of the Irish peasants resemble in temperament?

What effect did the War of the Nations have on the government of Ireland?

Other Items of Interest. The Catholics of Southern Ireland refer to the northern Protestant part of the island as the "Black North."

On a hill in Donegal there is a flat rock which is believed to have the power of warding off homesickness forever from any who sleep on it. Many emigrants, therefore, leaving their beloved Donegal, spend their last night on this hard couch.

Though Cromwell reduced much of Ireland, and though the visitor who to-day inquires about a ruined castle is likely to be told that "Crummle desthroyed it," the Irish do not hate the memory of Cromwell. They have a great respect and admiration for real manhood wherever they see it, and they do not fail to recognize it in this man who once and for all subdued much of the island.

Despite the fact that the peasants of Ireland have emigrated in great numbers, they have in general an abhorrence of travel, and very few of them ever are tempted to leave their own county unless it is absolutely necessary.

In some of the mountainous districts of Northern Ireland the people resort to as remarkable expedients as do the Chinese to produce their crops. They sometimes toilsomely carry earth up the hillside and spread it over a little ledge, on which the seeds are then sown. A.MC C.

Consult Johnson and Spencer's *Ireland's Story;* Joyce's *Child's History of Ireland;* Yeats' *Irish Fairy and Folk Tales.*

Related Subjects. The following articles in these volumes are related more or less closely to certain phases of the geography, history or life of Ireland:

CITIES AND TOWNS

Belfast	Limerick
Cork	Queenstown
Dublin	

HISTORY

Cromwell, Oliver	O'Connell, Daniel
Druids	Parnell, Charles Stewart
Emmet, Robert	Patrick, Saint
Gladstone, William E.	Round Towers
Henry VIII	Strafford, Earl of
Home Rule	War of the Nations

LEADING PRODUCTS

Barley	Oats
Flax	Potato
Linen	Ship

WATERS

Irish Sea	Saint George's Channel
Killarney (lakes)	Shannon

UNCLASSIFIED

Blarney Stone	Hibernia
Emerald Isle	Shamrock
Giants' Causeway	

IRELAND, JOHN (1838-), archbishop of Saint Paul, Minn., since 1888, an active and influential factor in colonizing the Northwest and in establishing the Catholic University in Washington. To his many reform movements he brought the enthusiasm, energy and ability of a born leader. He was born in County Kilkenny, Ireland, and was educated for the priesthood in France. Soon after his ordination, in 1861, he became prominent as a temperance advocate. He traveled for the cause all over the United States, and carried the battle into Ireland and Great Britain. From the liquor problem he turned his attention to the evils of congestion of immigrants in tenements. He purchased two great tracts of land in Western Minnesota and within the first year succeeded in placing over nine hundred Catholic colonists on prairie farms. He is an aggressive American, to whom his Church is indebted for many of its large activities, social as well as spiritual.

ARCHBISHOP IRELAND

IRID'IUM, the heaviest substance known, more than 22.5 times heavier than water. Iridium is a whitish metal found in connection with platinum, and takes its name from the variety of colors it displays when dissolving in hydrochloric-acid. It forms alloys with gold, copper and platinum. The gold alloy resembles the pure metal; that with copper is very hard, and that with platinum is sometimes used for making standard measures, such as the yard and the meter. Iridium ores occur on the Pacific coast of the United States and Canada and in the Ural Mountains.

I'RIS, a family of plants closely related to the lilies, whose home is in the marshes and wet meadows of the north temperate zone in both hemispheres. The leaves, rising from bulb or rootstock, are narrow and erect, like blades of grass; the flowers resemble some of the lilies, and range in color from white through blues and lavenders to deep purple. Some of the German branch of the family, which have long been cultivated, show glorious yellows, bronzes and reds. The more common American irises are the large *blue flag* of the marshes and the smaller *purple flag.*

The legends of the iris are many. The Greeks named it after the goddess of the rainbow because of its wonderful colors; in poetry it stands for wisdom, truth and courage, and for centuries it has been the emblem of chivalry. The white iris was chosen by Louis VII, in the twelfth century, as the flower of the kings of France, and it became known as the fleur de Louis (*flower of Louis*) which changed slowly to *fleur-de-lis* and *flower-de-luce*. It is now the national flower of France, and also the emblem of the Italian city of Florence.

IRIS
Flower, leaf and rootstock.

IRIS, in Greek mythology, the special golden-winged attendant and messenger of Juno, or Hera, the queen of heaven, whose commands she executed with tact, intelligence and swiftness. Iris is usually represented seated behind the chariot of Hera, robed in an airy fabric of variegated hues resembling mother-of-pearl. The rainbow was originally regarded as the path over which she passed to earth, and thus Iris came to be the personification of the rainbow.

IRISH, *i'rish,* **LITERATURE.** This term has two meanings. It may refer to productions in the old Irish, or Gaelic, tongue, or to those written in English by Irish authors. The latter is of far more general interest, but the former is well worth brief comment.

In Irish. Some very old inscriptions are still in existence which date presumably from the fifth century, but the oldest manuscripts are probably from the seventh century. One of these manuscripts contains in metrical form a life of Saint Patrick, which, however, is so interwoven with legends of miraculous happenings as to be of little authority. In the next age—the age after the Danes had been overthrown (see IRELAND, subtitle *History*)—poetry flourished. These early Celts, barbarous as were some of their ways, produced excellent architecture, their manuscript books were exquisitely illuminated, and in even the common articles of household use they showed a keen sense of the graceful and artistic. They were lovers of music, and a poet with his harp was almost as powerful as a king. The ballads or epics of heroes sung by these bards show considerable poetic skill and are the finest specimens of native Irish literature. Some of these are partly in prose, and even here there are manifested a remarkable vividness of description and the charm of unrestrained fancy.

Later Irish literature is of less significance. As the English language became more common and the Irish-speaking part of the population became smaller and lost its interest in education, fewer and fewer works were produced. Prose, indeed, practically ceased after the seventeenth century, but the musical old tongue continued to be used for poetry well into the nineteenth century, and played a real part in keeping alive a feeling of nationality. At last poetry, too, died out, and it seemed as though the language might fall into total disuse. In the early twentieth century, however, a Gaelic League was formed with the object of reviving the use of Irish, and within a very short time it had almost a thousand branches. It has brought about the study of Irish in the schools, and it publishes numerous books and magazines.

In English. Not until the late eighteenth and early nineteenth century did there exist such a thing as an Irish literature in English. It began, as the old Irish literature had begun, with ballads, and one of these, *The Wearin' o' the Green,* has become widely known. The first stanza of this poem, dear to Irishmen everywhere, runs as follows:

O Paddy dear, and did you hear the news that's goin' round?
The shamrock is forbid by law to grow on Irish ground;
St. Patrick's day no more we'll keep; his colors can't be seen:
For there's a bloody law again' the wearin' o' the green.
I met with Napper Tandy, and he took me by the hand,
And he said, "How's poor old Ireland, and how does she stand?"
She's the most distressful country that ever yet was seen;
They are hangin' men and women for the wearin' o' the green.

Thomas Moore is the most distinguished poet of this early period, and his *Irish Melodies* did much to awaken literary interest. Particularly well known is the little poem here given, referring to the harp, the national emblem of Ireland:

No more to chiefs and ladies bright
The harp of Tara swells:
The chord alone, that breaks at night,
Its tale of ruin tells.
Thus Freedom now so seldom wakes,
The only throb she gives
Is when some heart indignant breaks,
To show that still she lives.

Irish poets have always possessed the peculiar Irish qualities of imagination and fire, and much of their verse has had as its distinct object the awakening of national passion and the expression of patriotism. The first Irish prose-writer of note was Maria Edgeworth, and she was followed by Samuel Lover and Charles Lever, with their typically Irish tales—both novelists of whom any literature might well be proud.

For a time literary effort ceased, and Ireland seemed to have lost the creative spirit, but late in the nineteenth century there came into notice a movement known as the Irish Literary Revival, which brought to the fore a number of writers of acknowledged power. Perhaps the chief of these was William Butler Yeats (which see), whose plays and poems breathe the very spirit of Irish romance. Dramatic literature was one of the branches which profited most by this revival, and some of the plays of Lady Gregory, Yeats and John Millington Synge, as set forth by the Irish Players, attracted the attention of the entire theater-going world. Of the poetry of Ireland in this late era, with its simplicity, its beauty and its love for Irish soil, the *Lake Isle of Innisfree,* by Yeats, will give an idea:

I will arise and go now, and go to Innisfree,
And a small cabin build there, of clay and wattles made;
Nine bean rows will I have there, a hive for the honey-bee,
And live alone in the bee-loud glade.

And I shall have some peace there, for peace comes dropping slow,
Dropping from the veils of morning to where the cricket sings;
There midnight's all a glimmer, and noon a purple glow,
And evening full of the linnet's wings.

I will arise and go now, for always night and day
I hear lake water lapping with low sounds by the shore;
While I stand on the roadway, or on the pavements gray,
I hear it in the deep heart's core.

This brief sketch does not include the names of all the distinguished Irish writers. There have been, for instance, Swift, Goldsmith, Lecky, Oscar Wilde and G. Bernard Shaw; but they are not in their writings typically Irish. Practically everything they wrote might have been just the same had they been born on the other side of the Irish Sea, but in the works of the authors discussed above nationality has been a dominating factor. Each writer of note named above is described in alphabetical order in these volumes. E.M.T.

Consult Krans' *Irish Life in Irish Fiction;* Yeats' (editor) *A Book of Irish Verse.*

IRISH MOSS, or **CARRAGHEEN,** *kar'a geen,* is the name applied to several species of seaweed which abound in the rocky districts of Great Britain and Ireland and on the east coast of North America. The Irish moss of

IRISH MOSS

commerce has a thick, forked, somewhat fan-shaped frond, usually green or purple. It is gathered from the rocks, and is washed, sun-bleached and dried. It is nutritious and may replace animal jelly as the basis of soups and desserts, and is used by painters as the foundation of size. It is also of value in the treatment of lung troubles, when prepared medicinally in connection with other drugs.

IRISH SEA, a small sea which separates Ireland from Great Britain. From Saint George's Channel, at the south, to the North Channel, both opening into the Atlantic Ocean, the distance is about 130 miles. The greatest width of the sea is 140 miles. In the north is the Isle of Man, and in the southeast the island of Anglesey.

IRKUTSK, *ir kootsk',* the largest town in Siberia and the capital of the province of Irkutsk, is situated on the Angara River and on the Trans-Siberian Railroad, about forty miles from the southern extremity of Lake Baikal. After a destructive fire in 1879 the place was almost entirely rebuilt, and now it presents all the features of a beautiful, modern city. It is well laid out, and has wide, well-paved streets, many public buildings, a theater, a library, a museum and a branch of the Imperial Geo-

cal Society. The climate is healthful, to the high altitude. Irkutsk is an im- t commercial point, for it is the central g station for China, Siberia and Russia. quantities of silk, porcelain and furs are iged there. The population in 1911 was), 5,000 being exiles. It was thought that of the latter would return to European after the amnesty which followed the n revolution of 1917.

N, *i'urn,* a metal which might well be the keystone of modern industry and al civilization; if deprived of it, the would almost be reduced to the state barbaric ancestors. We have only to bout us to realize its importance. Our are entirely or in part held together n nails and screws; our doors are hung n hinges and have iron latches and locks, e use iron stoves and iron cooking uten- Our clothing, too, is partly iron, for we ails in our shoes. The trains and street nd automobiles that take people to work ie tracks upon which the first two run gely of steel (which is one form of iron), ir business buildings are often built with frames or of concrete reinforced with

stry is dependent most of all on this ex- gly valuable metal, for practically all nes and tools in factories or on farms, ack hammers to giant cranes, are com- of it, and iron steamers and iron engines their products. Besides serving us in all ways and countless others which sharp ill discover, iron because of its magnetic ties makes possible the telegraph and one. Last of all, it is a part of our own and is present in plants, giving to the eir red blood and to the second their leaves.

Imagine how helpless we should be without saws and knives and with hammers and hatchets of stone! The commencement of the Iron Age marked a great step in mankind's history. We do not know just when this was; of course it was at a different date in different parts of the world, and to some races it has not yet come. There is a piece of iron in the British Museum in London which is thought to have been made six thousand years ago. It is Egyptian, but probably the Assyrians were the first to become skilled workers in the metal. From them the neighboring nations learned of it and we read of iron in the very oldest books of the Bible. The ancient Britons appear to have discovered for themselves the art of smelting, but may have been taught it by the Phoenicians. It must have been by accident that iron became known, for it is very seldom found in the pure state, and to separate it from its ore requires intense heat.

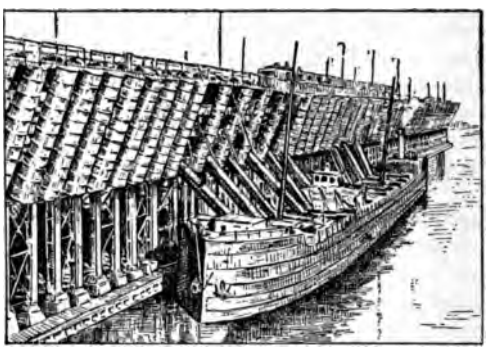
Iron Ore. There is iron almost everywhere. It is part of the sun and the planets, and is the commonest element in the meteorites that fall from the sky. On the earth it is present in all good soils, but of course to mine it does not pay, except where there are large quantities of it. Many deposits of iron ore which are at present untouched will become valuable when the price of the metal rises, when new inventions make mining cheaper, or when improved transportation brings them into closer touch with the centers of manufacture.

The ore is usually hard rock, which must be blasted and mined underground, but in the great Mesaba range of Minnesota it is so soft and so near the surface that it is taken out with steam shovels running on railroad tracks. These shovels can load a fifty-ton car in three minutes. This accessibility makes the Mesaba the most valuable iron region in the world.

How Iron Is Manufactured

use it takes two tons of fuel to smelt one iron ore it is economical to carry the the coal regions. Thus in the United the great centers of iron manufacture and around the coal fields of Western lvania, which is also nearer to the points the finished steel and iron are wanted. Birmingham district of Alabama both nd iron, and a third important element, ne, are found; this unusual combination smelting profitable, though the ores con- ss iron than those usually mined. The steam-shovel-mined ore from the great Minnesota mines is taken by railroad to Lake Superior and fed into ore-carrying boats through chutes from a high dock. At the other end of the Great Lakes it is unloaded mechanically and left in huge piles outside the works. Because the lakes are frozen in winter a year's supply has to be brought each summer. Recently a ten-million-dollar plant was erected at Duluth by the United States Steel Corporation, and this establishment will consume great quantities of raw material.

The Blast Furnace. In ancient times iron was smelted in pits of clay. The ore was broken up and placed in alternate layers with charcoal. Then clay was plastered over all, small holes being left at the top and bottom for the draft; this was originally secured by



LOADING ORE IN MINNESOTA

locating the furnace near the top of a hill where the prevailing winds would blow up through it, but later a goat-skin bellows was employed. Softened by the intense heat, the iron would flow through the lighter cinders and waste matter and would drop to the bottom of the furnace and after several hours could be taken out in a lump. This method, however, so imperfectly separated the iron from its ore that in modern England it has been found profitable to smelt the *slag* (which is the mixture of cinders and waste) left from the ancient Briton furnaces.

The blast furnace of to-day, though much larger and more elaborate than the primitive one, works in a similar way. It is a steel-enclosed cylinder of fire brick perhaps a hundred feet high. Into it, after a coke fire has been built, a *charge* of ore, coke and limestone is poured. The last material is included to bind together the slag so that it will flow out of the furnace. A blast of warm air is blown into the furnace from near the bottom and, together with the gases which the fire separates from the solid materials, passes off through a pipe at the top. Sometimes this combination of air and other gases is then sent through a dust catcher and used as fuel to run the engines which compress the original charge of air. If the fire in a blast furnace is allowed to die out, the charge becomes so solid that no air can again pass through it to smelt it, and the furnace has to be pulled down.

Below the point at which the air enters the furnace there are two holes, the upper to flush out the slag, the lower to let out the heavier molten iron. About every four hours the latter is drawn off, but the slag is tapped more frequently to prevent its rising to the point where the blast of air enters.

The ordinary charge of a blast furnace consists of four parts of ore, two of coke, and one of limestone, through which eight parts of air are forced. From this total only two parts of iron and one of slag result, over half of the solid materials passing off in gases. Coke is the usual fuel, because it is economical and because it will sustain the weight of a heavy charge without being crushed so that the air cannot pass up through the mass. A charcoal furnace could not be more than about forty feet high, but charcoal, because of its different chemical effect, is still superior for smelting certain qualities of iron.

Pig Iron. In the older plants the iron as it comes out of the blast furnace flows through a trench of sand into little branch trenches, where it hardens in bars called *pigs*. In many of the newer foundries the pigs are formed by machinery, the molten metal running into molds which are moved on a chain through cold water and dumped into waiting cars. Pigs are seldom more than ninety-five per cent iron, for they contain in addition carbon, manganese, phosphorus, sulphur and silicon, in varying quantities. Each of these elements is

GREAT LAKES ORE BOAT

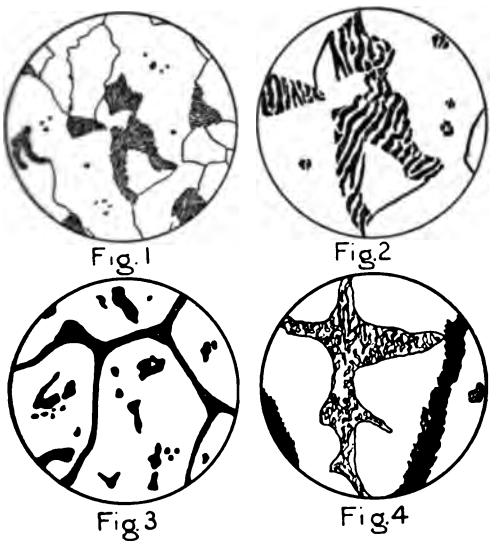
This type of vessel is built 550 to 600 feet in length. It will carry 10,000 tons of ore.

described in its proper place elsewhere in this work, and some of their effects upon iron are told later in this article.

Pig iron might be called the raw material of the iron and steel industry. From it most of our steel and other forms of commercial iron are made. Where steel companies have their own blast furnaces the pig iron is generally put into the converters for transformation into steel while still molten, to save the expense of reheating.

Cast Iron. The ornamental brackets on school desks and on stoves are examples of

cast iron. They are made by remelting pig iron and pouring it into specially-shaped molds. Cast iron is not malleable; that is, if you hammer it you will break it. Its softness is due to carbon and silicon, its brittleness principally to phosphorus and sulphur. In 1915 an



IRON AND STEEL SEEN THROUGH THE MAGNIFYING GLASS

Fig. 1. Soft, or low-carbon, steel. The light spaces are iron; the dark, combined iron and carbon, called *pearlite*.

Fig. 2. Pearlite, which resembles mother-of-pearl, is formed of alternate plates of iron and carbide less than $\frac{1}{25,000}$ of an inch thick.

Fig. 3. Steel with too much sulphur. The lines and spots between the grains of iron are iron sulphide, which melts more easily than iron and makes the steel brittle when heated.

Fig. 4. Cast iron. Breaks are liable to occur along the black lines, which are plates of graphite. The mottled areas are iron and phosphorus and carbon; the white are iron crystals.

oil-burning *cupola*, or melting furnace, which produces iron with less sulphur, was adopted by a few manufacturers.

Wrought Iron. Iron which can be hammered into shape as a blacksmith hammers a horseshoe is wrought iron. It contains very little carbon. The metal lump made in the ancient clay furnace was wrought iron, which requires less heat than cast iron.

Nowadays it is much cheaper to make wrought iron from pig iron than directly from the ore. While the pigs are in the long horizontal furnace called a *puddling* furnace, the charge is stirred through a small door, with a sort of hoe. When most of the carbon and other impurities have been burned off a pasty mass of iron results. This is broken into balls of one or two hundred pounds and put through a squeezer, which crushes out most of the intermingling slag and welds the grains of iron together. The metal is then rolled into bars, cut in pieces, piled, heated and rolled again several times. Wrought iron may also be made from scraps of cast iron and steel.

A piece of wrought iron can be welded to another piece without solder, an operation impossible with any other metal but steel or platinum. Its principal value is for bars, bolts and plates.

Slag, far from being useless waste, is an excellent material for ballasting railroad tracks and makes a good basis for concrete. When it contains considerable phosphorus it is employed as a fertilizer.

Steel, which is intermediate between cast iron and wrought iron in the amount of carbon contained and is stronger than either, is fully dealt with in the article under that title.

Sources of Iron Ore. The United States normally produces from thirty to forty per cent of the world's iron ore, or about 55,000,000 gross tons. The War of the Nations caused a decrease in the European output, but ordinarily Germany is second to the United States, with a production half as great. France, which was fifth in 1906 with 8,000,000 tons, ranked third in 1913, with 21,000,000 tons. The United Kingdom mines about 16,000,000, Spain 9,000,000, Sweden 7,000,000 and Austria-Hungary 5,000,000 tons. Cuba and Newfoundland, with over 1,000,000 tons each, rank second and third in North America, while Canada's production is sometimes 300,000 tons.

In present production the greatest iron ore district of the world is in the Mesaba range of Minnesota. Together with the other mines of the Lake Superior region it sometimes produces nearly ninety per cent of a year's American output. The United States Steel Company, the so-called "steel trust," has its ore properties in this district, but within the last few years some of the large steel companies of the Eastern coast have been importing their ores from Chile through the Panama Canal, and from Cuba.

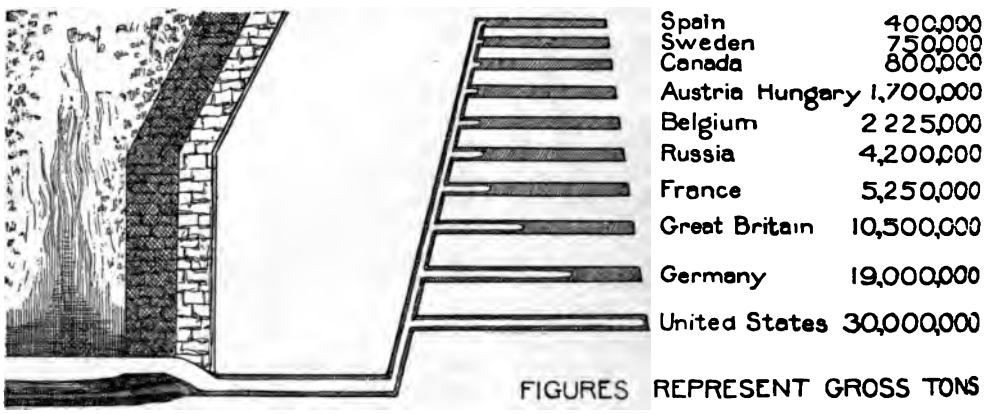
To be worked in the ordinary manner ores must contain at least forty per cent iron. Those of the Lake Superior region yield on the average about fifty-five per cent. There are several methods of preparing ore when it is below the requirement. It may be *washed* to drive out the minerals of different weight; or *weathered*, that is exposed to the air, to free it of certain chemicals; or *roasted*, for the same

purpose, especially to get rid of too much sulphur. *Calcination,* a fourth process, differs from roasting in that air is not freely admitted.

Hematite and magnetite are the names of the two principal varieties of ore. The first takes its name from the Greek word for *blood;* it comprises over ninety per cent of the American ore. Both varieties are more fully described in articles under their own names in these volumes, in alphabetical order.

Strength and Other Qualities of Iron

Though iron sturdily resists most of the varieties of strain described in the article STRENGTH OF MATERIALS, the property in which it exceeds all other materials is *tensile strength,* or resistance to stretch. Pure iron will withstand a pull of 40,000 pounds to the square inch, and with the addition of proper amounts of carbon becomes much stronger. Special piano wire has been made with a tensile strength nearly twelve times as great, and the usual strength of structural steel is from 50,000 to 70,000 pounds, and of machine steel from 60,000 to 90,000 pounds per square inch. Wood, which it seems strange to think of as pulling apart, is seldom able to resist over 12,000 pounds. It is because of this property that steel rods are embedded in concrete, for the latter, though it cannot be easily crushed, is pulled apart with comparative ease.



ANNUAL OUTPUT OF PIG IRON IN THE TEN LEADING IRON-PRODUCING COUNTRIES

The figures given are for normal years, unaffected by war. To illustrate the usual method of making pig iron, the hot molten iron is represented as flowing out of the blast furnace into trenches in the sand. The amount of metal which has flowed into each trench is in proportion to the production of the country whose name accompanies it.

The pictures accompanying this article show why iron varies in endurance. Some forms of the metal look white at a broken surface; others, black or speckled. In the first case the carbon has combined chemically with the iron; in the second, part of it has remained free, in the form of thin sheets of graphite between the particles of iron, and any breaks which occur are apt to be due to its presence. Beyond a certain point the iron is not able to absorb the carbon, so it is easy to see why steel is stronger than either wrought iron, which has little carbon, or cast iron, which contains more than it can absorb.

Iron and steel makers exercise great care and ingenuity in regulating the amount of carbon and other impurities in their product to suit the purpose for which it will be utilized. The time of cooling must be controlled very carefully. If the metal is cooled rapidly the carbon does not have time to separate into graphite. This fact explains why *chilled* plows are superior to others and why steel is strengthened by being *tempered,* that is, by being plunged into cold water or oil. It is said that the famed sword makers of Toledo and Damascus could temper a sword so thoroughly that the point could be bent to touch the hilt. Manganese and sulphur assist the carbon in combining, while silicon and phosphorus have an opposite effect. When it is desired that iron be soft, so that it can be drilled or cut, silicon is included in large quantities, to assist the formation of graphite. Phosphorus is increased where intricate molds are to be used for cast iron, because it assists the flow of the metal. Too much sulphur is detrimental, for it cools and contracts more slowly than the rest of the materials and leaves small spaces.

otal amount of combined and uncom-
rbon present in iron is largely regu-
ough the heat applied in its manufac-
hough pure iron does not melt below
, it begins to undergo changes at 1,400°.
° it begins to absorb carbon, and as it
its melting point is lowered, so that
ch contains 4.3 per cent carbon melts
F.

This is in effect a partial burning of
, and therefore weakens it. For this
ridges and other steel structures are
coated with a waterproof paint before
color is applied, and other forms of
galvanized, or coated with zinc. The
though ignorant of iron, used its
rust, for red paint, and we ourselves
he beautiful colors which it gives to

tism. This affects all iron, but is
only by the harder forms. By utiliz-
principle that soft iron ceases to be a
when the electric current is shut off,
en possible to produce the telephone,
raph and the valuable electro-magnet.
ated to 1,400° F. loses its magnetic
s. Magnetite ore gives iron of greater
properties than other varieties, and
n is a better conductor of electricity
onized iron.

ecific gravity of iron is 7.85; that is,
times as heavy as water. E.S.

t Lindgren's *Mineral Deposits;* Eckles' *: Their Occurrence, Valuation and Con-*cheleau's *Great American Industries;* *Resources of the United States,* a issued by the United States Geological

d Subjects. The reader of the above n will find much of interest in the fol-rticles in these volumes:

	Magnetite
	Malleability
on	Manganese
	Phosphorus
	Rolling Mill
agnet	Rust
agnetism	Silicon
	Slag
Specific	Steel
	Strength of Materials
	Sulphur
e	Telegraph
nd Magnetism	Telephone

AGE, the last of the prehistoric ages, the ages of bronze and stone. It period in the development of civiliza-n iron began to be used for tools and . Before the Iron Age all tools were made of copper, bronze and chipped or polished stone; but the ancient peoples somehow discovered that iron was harder than bronze, that it would take a sharper edge, and that, since it required no fusing or mixing of metals, it was much easier to work. They also discovered that iron beaten or hammered into shape was stronger and less breakable than iron *cast* into shape, so most implements of the Iron Age are of *wrought* iron, as hand-hammered iron is called. Many of them were skilfully made and beautifully decorated; some, evidently of a later date, have symbols and letters upon them indicating the beginning of writing.

The peoples of Southern Europe learned how to use iron long before those of the northern countries. The age of Aeneas, Achilles, Helen of Troy and King Menelaus, portrayed by Homer in his *Iliad* and *Odyssey,* was the first of the Iron Age, but the people of the Norse lands knew little of iron previous to the time of Caesar, about fifty years before Christ. See IRON.

IRON CROSS, a German military decoration awarded to officers and men of the army and navy for acts of bravery or for distinguished service in war. As its name indicates, it is made of iron, and it has therefore no intrinsic value, while its design, as shown in the illustration, is very simple. This decoration was instituted by King Frederick William III of Prussia in March, 1813, at the time of the struggle of Germany against Napoleon. At that time it was given only to Prussians, but when it was revived during the Franco-German War in 1870 it was awarded to any German soldier who deserved to receive it. There are two classes, the first and second, awarded according to the merit of the deed performed.

AN IRON CROSS
Presented for valor in 1916.

In simplicity of design, small intrinsic value, and the honor and reward bestowed upon the

recipient, this decoration reminds one of the rarely-bestowed English decoration, the Victoria Cross (which see). A noticeable fact during the War of the Nations was the large number of German soldiers who received the Iron Cross as compared with the small number of British soldiers who received the Victoria Cross. It was estimated that for each recipient of the Victoria Cross there were at least three thousand recipients of the Iron Cross; it was decreed by the German authorities that no unusual act of bravery should be unrewarded.

IRON CROWN OF LOMBARDY. See subhead under CROWN.

IRON MASK, THE MAN WITH THE, a mysterious French character confined in the Bastille and other prisons during the reign of Louis XIV, to whom he was believed to be related. His face was always concealed by a mask of black velvet, and his name was never mentioned, but he was buried under that of Marchiel, in 1703. Many romantic stories were circulated regarding him, but his identity was never established; it is only known that his speech was pleasing and his bearing that of a gentleman. The whole matter constitutes one of those historical mysteries which will never be satisfactorily solved, but which will continue to fascinate and mystify the world. Alexandre Dumas' romance, *The Man of the Iron Mask,* deals with the life of the unknown prisoner.

IRON MOUNTAIN, a low peak of the Saint François Mountains in Southeastern Missouri, so called because of its great deposits of high-grade magnetic iron ore. The hill also contains porphyry, a hard, purplish stone which takes a high polish and is used for decorative purposes. The mountain rises 1,097 feet above sea level and is about 300 feet higher than the surrounding country. It is heavily wooded with oak trees.

IRON MOUNTAIN, MICH., the county seat of Dickinson County, known chiefly through its iron-mining interests. It is situated on the Menominee River and on the southwestern border of the Upper Peninsula. Escanaba is sixty-two miles east, and Green Bay, Wis., is 100 miles south. Transportation is provided by the Chicago & North Western, the Chicago, Milwaukee & Saint Paul and the Wisconsin & Michigan railways. The place was settled in 1879, and was incorporated as a city in 1891. It owes its name to the mountains in the locality, which contain immense deposits of iron ore. In 1910 the population was 9,21 The area of the city is six and one-half squa miles.

Aside from its extensive iron-mining indu try, Iron Mountain is the commercial cent for a farming district in Wisconsin and for large mining section in Michigan. The ci is located 1,160 feet above sea level, am beautiful mountain and river scenery. It has park of forty acres, a high school buildin erected in 1913 at a cost of $200,000, a Ca negie Library, a business college and two ho pitals. J.M.G.

IRONSIDES, OLD. See CONSTITUTION, THE

IRONTON, OHIO, the county seat of Law rence County, situated on the Ohio River ne its most southerly dip as the southern sta boundary, 134 miles east and south of Ci cinnati and 100 miles southeast of Columbu It is on the Cincinnati, Hamilton & Dayto the Chesapeake & Ohio and the Norfolk Western railroads. The Chesapeake & Oh Railway, on the Kentucky side of the riv operates passenger and freight ferries to Iro ton. The population was 13,147 in 1910, a 13,949 in 1916, by Federal estimate. The ar of the city is two and one-half square miles.

Ironton contains a Federal building, a cou house, Briggs Public Library, Memorial Ha Masonic Temple, Odd Fellows' Hall and a ci hospital. The city is surrounded by a secti rich in timber, iron ore, bituminous coal, a fire and pottery clay, and has a thriving riv trade, especially in lumber. Important indu trial plants are manufactories of iron and ir goods, cement, lumber, machinery, boile stoves, furniture and fire brick. Ironton w settled in 1832, and was incorporated in 1849.

IRONWOOD, the popular name for *hor beam,* a large family of trees whose snow white wood excels the best oak in durabilit Many species are found, in nearly all temp ate climes. In the Orient it is planted arou the Buddhist temples for its fragrant flowe while in America the smaller, wiry species, fro twenty-five to forty feet high, with birch-lil foliage, grow in the shadows of the fores both north and south. The slender trunks a gnarled and swollen in ridges under the clo gray-blue bark. The flowers grow in catki much like the hop, hence the common nam of *hop-hornbeam,* while the tiny, boat-lil seeds sail off on the wind to be distributed (s CROSS-FERTILIZATION).

The flexible branches of the European hor beam, which in many respects is very simil

to the American species, are woven together to make the curious live fences, or roofed walks in gardens. Although the wood is very heavy and hard to tool, it will last indefinitely when once in shape. In Southern Florida and the West Indies it is used for shipbuilding because it resists all attacks of the shipworm, while in Europe yokes made of it last for years, becoming as hard and smooth as horn. Sled stakes, tool handles, wedges, fence posts and levers are made from it.

IRONWOOD, MICH., a lumber and mining center of Gogebic County, situated in the extreme western part of the Upper Peninsula, about twelve miles south of Lake Superior and thirty-three miles southeast of Ashland, Wis. It is on the Montreal River and on the Chicago & North Western and the Minneapolis, Saint Paul & Sault Sainte Marie railroads, and has the service of short interurban lines. The area of the city is about six square miles. In 1910 the population was 12,821; in 1916 it was 14,779, by a Federal estimate.

Its name suggests the chief industries of the city, iron mining and lumbering. Here are some of the largest iron mines in the United States, and coal and pottery clay are found in the vicinity. The industrial establishments are foundries and machine shops, blast furnaces, rolling mills, wire-drawing and nail works, and manufactories of machinery, boilers, stoves, lumber, furniture and cement.

Ironwood has a city hall, the Luther L. Wright High School and a Carnegie Library. The city was settled in 1884 and incorporated in 1887; its charter was revised in 1893.

IRONY, *i'ro ni.* This word, which comes from a Greek term meaning *to dissemble,* or *to say less than is meant,* is used to describe one of the most forceful figures of rhetoric. The writer or speaker who employs irony makes a statement, apparently in all seriousness, when in reality he wishes to convey just the opposite meaning. In his wonderful speech over Caesar's body, for instance, Antony refers several times to the "honourable men whose daggers have stabb'd Caesar," and thus by his ironical use of the word *honourable* stirs up his hearers to a frenzy. Defoe and Swift are perhaps the two great masters of irony in English literature, but while the irony of the former is kindly, that of Swift has an almost insane bitterness.

IROQUOIAN, *ir o kwoi'an,* **INDIANS,** one of the most important groups of North American Indians, whose stock name is derived from that of the Iroquois, who figure so largely in early American history. The largest single tribe of Iroquoian descent is the Cherokee (which see). The Iroquois Indians were a league of five tribes—the Mohawks, Oneidas, Onondagas, Cayugas and Senecas. Later they were joined by the Tuscaroras. To them the English applied the names "Five Nations" and "Six Nations." According to legend the five tribes were persuaded to form a confederacy by their great chieftain, Hiawatha, whom Longfellow has made the hero of his poem of that name.

The Iroquois Indians were settled in Central and Western New York when, in 1609, they were found by the French explorer Samuel Champlain. He, unfortunately for France, made friendly overtures to their hated enemies, the Algonquians, and in the subsequent wars between France and England the Iroquois lent powerful aid to the latter nation. During the American Revolution all of the Iroquois except the Oneidas and a few of the Tuscaroras sided with the English, and the Mohawks and Cayugas, led by Joseph Brant, went to Canada. Nearly all of the surviving Iroquois in the United States are on reservations in New York; the majority, in Canada, live on the Grand River reservation, Ontario. They number in all about 17,000.

These Indians were above the average in intelligence. They had organizing ability of no mean order, lived in well-built bark-covered houses, and were skilled agriculturists, basket-makers and potters.

Related Subjects. The reader is referred to the following articles in these volumes:

Brant, Joseph
Champlain, Samuel de
Five Nations
Indians, American

IRRAWADDY, or **IRAWADI,** *ir ah wah'di,* the principal and most picturesque river of Burma, flowing for over 1,500 miles through rocky mountain gorges and thickly-populated agricultural districts down into the broad, flat rice fields on the delta, through which it enters the Bay of Bengal. It rises near Mount Daphabum, on the extreme northeast border. Small steamers ply regularly to Bhamo, which is over 1,000 miles from the mouth of the river. For 100 miles from the sea extensive embankments have been built to protect property along the delta, for it is in great danger during the summer months, when the river rises. A railroad runs through its valley from Rangoon to Bhamo, and crosses it at Mandalay.

IRRIGATION, *ir i ga'shun.* Nearly everyone has had some experience with flower culture and knows how important it is that the plants should be watered at certain stages of their growth. Though other plants are less delicate, they are no less dependent on water, and if all that they require does not come to them in the form of rain or of moisture in the soil, it must be given to them by man. Irrigation, or artificial watering of vegetation, has been practiced in simple ways for thousands of years, but only within the last half century has scientific knowledge been applied to watering the waste places. Men knew that with the aid of water crops could grow in the desert, but they did not know how much water was needed for the best results, when to supply it, or how to handle it without waste.

How Lands Are Irrigated. There are a number of methods for distributing the water over fields. In more than nine-tenths of the irrigation in the United States and Canada water is brought to the fields through ditches. The main ditch or canal takes the water from the source of supply, and head ditches join the main ditch on each side at regular intervals. A gate prevents the water from entering the head ditch when it is not needed. At the time of irrigating this gate is opened. The plan of distributing the water over the field is determined by the crop. Fields on which alfalfa, wheat or other crops of similar character are grown are usually flooded, which is done by placing a portable dam usually made of canvas across the ditch at intervals of about three rods. When the water has flooded one strip the dam is moved on to another, the process being repeated until the field is irrigated.

Fruits, potatoes, corn and other crops planted in rows are usually irrigated by running the water in furrows between the rows. Sprinkling and the use of underground pipes are other methods used to some extent in gardens and on truck farms, but both are expensive.

Whatever the method used, the ground must be prepared for the proper flow of water before planting. A slope from ten to twenty feet to the mile will usually allow the water to flow freely and without currents that may carry the surface soil along with them. Where the land slopes too rapidly checking is necessary, that is, ridges are raised around the edges of small plots, which are made practically level. The same rule holds in irrigating by furrows. The grade must be slight or the current will cause damage.

Development in the United States. Long before the white man came to America irrigation was carried on by the city-dwelling Indians of New Mexico and Arizona. In that region, and throughout most of Utah, Nevada and Southern California and parts of Colorado, Wyoming, Idaho, Washington and Oregon, less than ten inches of rain falls each year. This will sustain only such vegetation as the sagebrush and the cactus, which nature had adapted to arid regions. The Spaniards who came to America knew something of the irrigation systems which the Moors had established in Spain, and they taught the Indians to build masonry dams and reservoirs. The Mormons and other early settlers in the West found irrigation indispensable. When the pioneer gold-seekers were mining the California gold by washing it from the stream beds, many ditches were dug, some of which afterward proved even more valuable as irrigation ditches. But not until the last quarter of the nineteenth century were there more than a few thousand acres of land under irrigation in the whole United States. Then progress was rapid, and the census of 1890 reported nearly 4,000,000 acres of irrigated land. In 1894 Congress passed the Carey Act, which granted land to the states if the latter would build irrigation works. This law did not prove popular, and in 1902 a national Reclamation Act gave power to the Department of the Interior to construct irrigation systems. Of the more than 14,000,000 acres irrigated in the United States in 1910,

less than 1,000,000 were in the undertakings of the national government. About 3,000,000 acres are included in its projects, completed or under way in 1916, but as settlement on them is slow, little further construction is planned.

Though the number of acres watered by works of the national government is small compared with the total for private undertakings, most of the dams and reservoirs built by the reclamation service have been too large for construction by individual enterprise. The Roosevelt dam, shown in an illustration in the

AN IRRIGATION DITCH

article ARIZONA, is the best known. Arrowrock dam, in Idaho, finished in 1915, is the highest in the world. The largest irrigation reservoir ever built is at Elephant Butte dam on the upper Rio Grande; it will store more than 100 billion cubic feet of water, enough to cover the state of New York to the depth of an inch. The largest of the government systems in regard to the area affected is at Boise, Idaho, where 255,000 acres can be irrigated.

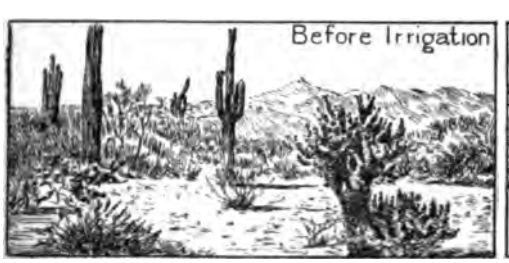
Progress in Canada. Though only a very small portion of Canada has as little rainfall as the desert regions of the United States, there is a large area in the west where it has been found wise to irrigate the land. Most of the irrigation systems are small and all have been built by individuals or companies. The Dominion government grants licenses to those who wish to divert water from rivers, and in one case has assisted with a loan of money, but it does not erect irrigation works.

The largest irrigation system on the American continent has been constructed in Alberta by the Canadian Pacific Railway. The water of the Bow River is diverted from a reservoir near Bassano to 440,000 acres of land. The dam which forms the reservoir is over 7,000 feet long and contains more material than any other in the world except the Assuan dam in Egypt. A picture of the spillway of the dam will be found in the panel which heads the article ALBERTA, and more information about Canadian irrigation is given in the articles ALBERTA, BRITISH COLUMBIA and SASKATCHEWAN.

In Other Countries. India leads all the world in irrigation. Fifty million acres of its land are artificially watered, half of them by government works, which in some years return nine per cent on the capital invested. One canal, the Chenab, serves nearly 2,000,000 acres, and its annual revenue is nearly twenty-five per cent of its cost. Others are operated at a loss, but the government finds it cheaper to build them than to supply food to the population in times of famine which would otherwise occur. The struggle of the British government against famine is one of the heroic things the natives have most heartily appreciated.

In Egypt the natives have carried water from the Nile in jars, or raised it with an Archimedean screw or diverted it to the land with simple dams and canals for forty centuries or more. The British have constructed works which irrigate 15,000,000 acres, among which is the great Assuan dam, the largest in the world.

The valleys of the Tigris and Euphrates were once well irrigated, and attempts are



being made to revive their old fertility by the construction of modern systems. Italy, Spain, France, Australia, Russian Asia, Mexico, China, Formosa and Java have large areas under irrigation. Argentina has planned one irrigation system which will cost as much as the total of the half dozen largest projects in the United States, and seven times as much as the Bassano system.

Results of Irrigation. Every year many settlers are attracted to irrigated farms in the West by the hope of large profits. Their enthusiasm gives rise to land speculation, and prices for farms in irrigation districts sometimes reach several hundred dollars an acre. The following figures, based on the United States Census of 1910, give some indication of what prices in most instances really should be. The table concerns the most profitable crops commonly raised on irrigated land:

CROP	IRRIGATED YIELD	UNIRRIGATED YIELD
Potatoes, bushels	153.6	103.8
Sugar beets, tons	11.89	9.7
Wheat, bushels	25.6	15.3
Alfalfa, tons	2.94	2.14
Oats, bushels	36.8	28.5

The average value of all irrigated crops except fruits and vegetables was $25.08 an acre, $7.54 more than for unirrigated crops. But this is nearly offset by additional cost of $7.26 for water, cost of maintenance and interest on the cost of irrigation works. It is to be concluded, then, that except in unusual circumstances irrigated land in the West should cost about the same as unirrigated land farther East.

Suppose a farmer pays $50 an acre for an irrigated farm. The average yield will be $25.08, less $7.26, or $17.82 an acre. Interest at eight per cent on the $50 is $4, but $2.55 of this has already been deducted in the census figures. If we deduct the balance, $1.45, the yield per acre becomes $16.37. From a forty-acre irrigation plot the average farmer would therefore receive $654.80 for his own labor, that of his family and any additional help. More valuable crops usually require additional labor and expenditure.

One fact, however, must stand out distinctly in comparing results from irrigated lands and from those not irrigated. In the latter instance good crops may be secured regularly for several years, after which there may be a season without rainfall, when crops are almost entirely lost. Every farmer in unirrigated territory dreads this possibility. On the contrary, a dry, devastating season never is feared on an irrigated farm. Water in abundance is always assured, and loss of crops from dryness is impossible.

In some arid regions special crops can be raised where unirrigated lands cannot compete. Dates, figs, olives, English walnuts and Egyptian cotton, for instance, are well suited to parts of the Southwest, and their production is certain to become important. Much of the Canadian irrigation is in connection with cattle rasing.

Dangers of Irrigation. Agricultural experts express some fear that land constantly irrigated will lose its productivity. The principal difficulty is from the accumulation of alkali which gradually takes place, appearing first in the lowest parts of the fields. Other causes of lessened crop yields are not yet well understood. C.H.H.

Consult Newell and Murphy's *Principles of Irrigation Engineering;* Dennis's *Reports on Irrigation and Canadian Irrigation Surveys;* Long's *Irrigation Law.*

Related Subjects. The reader is referred to the following articles in these volumes:

Archimedean Screw
Arizona
Assuan
California
Canada, subtitle Agriculture
Idaho

IRV'ING, SIR HENRY (1838-1905), an English actor who by virtue of untiring industry and study and determined adherence to the highest ideals of his art became the foremost man of the English stage of his day. Possessing in a high degree the artistic temperament, he strove to make the stage a potent educational agency. His repertoire included the masterpieces of dramatic literature, which he presented with strictest reference to historical truth, both as to costuming and time. He was born at Somerset. His real name was JOHN HENRY BRODRIBB; he chose Irving as his stage name, which was legalized by royal license. He was knighted in 1895 by King Edward VII.

HENRY IRVING

For a time Irving was engaged as a clerk in London, but he adopted the theatrical profession in 1856. A spirit of stern determination carried him through discouragements for four years, until he gained recognition in *The Two Roses*. Then followed his successful presentations of Matthias in *The Bells*, and the title rôles of *Eugene Aram, Hamlet, Macbeth, Richelieu, Richard III* and *Othello*. In 1878 he entered upon his memorable management of the Lyceum Theater, where his triumphs were shared by Miss Ellen Terry (which see). Here, as well as later in the United States and Canada, he was enthusiastically received in his interpretations of these and many other Shakespearean characters, in Tennyson's *Becket* and *The Cup*, in *The Corsican Brothers* and many other plays. He died in London a few hours after a performance of *Becket*. Irving's little mannerisms of voice, gait and gesture, as well as his lack of great emotional strength and fire, prevented him from attaining a place among the greatest actors of all time.

IRVING, WASHINGTON (1783-1859), America's pioneer in the field of general literature. He was born April 3, 1783, in New York City, the youngest of eleven children. His father was a stern Scotch Presbyterian, his mother a gentle English woman, and from both, it seemed, the boy inherited their best traits. But in his youth, especially, there was always in his character a touch of his own later Rip Van Winkle—he never took life quite seriously or saw the necessity of work. The education he obtained in his youth was slight, and because he lacked application he was never sent to college. At sixteen he entered a law office, only to continue eagerly poring over books of poetry and travel. Symptoms of lung trouble led him to spend much time, also, in rambles over the Sleepy Hollow region and sails up the Hudson and Mohawk rivers. In 1802, under the pen name of *Jonathan Oldstyle*, he wrote a series of letters for the *Morning Chronicle;* and this, his first real literary work, showed a style worthy almost of Addison himself.

In 1804 Irving sailed for Europe, and contrary to the expectations of the captain, lived to land, improved in health. On the Continent he roamed about, enjoying the art, literature and antiquities of France and Italy and gaining the friendship of many eminent people; in 1806 he returned to America, broader in knowledge, culture and sympathies, but still an idler. He was soon admitted to the bar, but gave much of his time to social pleasures, and within a short time began, with his brother William and James K. Paulding, to publish *Salmagundi,* a semimonthly periodical containing essays and sketches of various sorts after the manner of the *Spectator*. This paper was enthusiastically received, but after a score of issues the editors ceased their work. At about this time Irving's promised wife, Matilda Hoffman, fell ill and died. After Irving's death more than a half-century later, a letter in his own hand-

WASHINGTON IRVING

His books do good to all who read them, and are likely to outlast many works of far greater intellectual force and acumen.—HAWTHORNE.

writing was found, attributing to the depth of this early love the lonely bachelor life which seemed so strange for one of his genial nature. To escape his grief, he labored to finish *Knickerbocker's History of New York,* a delightfully humorous and mock-heroic story, which brought him immediate fame and profits.

Literature was not yet generally recognized as a means of livelihood, and Irving still tried to force himself to some surer occupation. The next five years he spent in a business partnership with his brothers, much of the time, however, enjoying Philadelphia and Washington society; for he failed hopelessly at regular work, both in his store and as editor of a magazine. In 1815 he sailed again for Europe —this time to be gone for seventeen years. His book had preceded him, and he was soon a favorite among English authors and society. In the crisis following the War of 1812 his brothers failed, and for the first time Irving's

real character appeared; he worked diligently to support not only himself, but his brothers, who were in poor health. Declining regular editorial work, he finished *Geoffrey Crayon's Sketch Book,* his greatest work. The best selections, *Rip Van Winkle* and the *Legends of Sleepy Hollow,* are read in every school as models of story-telling. In 1832, after a visit to France, he published *Bracebridge Hall,* an English "Sketch Book" containing much delicate humor and some charming stories.

After visiting the Rhine country he published, in 1824, *Tales of a Traveler,* which maintained his popularity. An invitation from the United States minister at Madrid to translate some Spanish documents turned his attention to the history of Spain, and his *Life of Columbus* at once gave him an honorable place among historians. *The Alhambra* and *The Conquest of Granada* followed, less important historically, but full of vivid and romantic description. In 1829 he returned to England, to serve as secretary of the American legation there. The Royal Society of Literature then awarded him a gold medal, and from Oxford came the degree of LL. D.

Returning to the United States, Irving was enthusiastically welcomed, for he was the first man who had won real recognition for American literature abroad. He purchased "Sunnyside," a country seat near Sleepy Hollow, and there with his nieces spent ten quiet years. He was perhaps the most prominent private citizen of his country, because of his character even more than of his work. Never a strong political partisan, he declined public office, and except for a trip to the Western prairies, spent his time in writing. His work at this time, in book form and for the *Knickerbocker Magazine,* includes *A Tour of the Prairies, Captain Bonneville* and sketches of the homes of Scott and Byron. While writing a history of Mexico, he learned that the blind Prescott was planning such a work. He courteously abandoned the field, and Prescott never knew what a sacrifice Irving had made.

For four years he served ably as minister to Spain, then gladly returned to "Sunnyside," where the rest of his life was passed. He was a cheery, jolly man, not unlike the Diedrich Knickerbocker he himself had created. His *Life of Goldsmith* is a delightful and sympathetic work, for the two men were much alike in their roving dispositions and their smiling indulgence for the world. After some lesser works, he finished the *Life of Washington,* a well-balanced and impartial biography, and soon afterward died, November 28, 1859. He was buried near Sleepy Hollow. C.W.K.

Consult *Washington Irving,* by Boynton, b Hill, or by Warner.

IR'VINGTON, N. J., in Essex County, is rapidly developing manufacturing town, whos population almost doubled between 1910, whe it was 11,877, and 1915, when it reached 20,3 It is three miles from Newark, with which it i connected by electric lines, and fourteen mil west of New York City. A freight line int the city is operated by the Lehigh Valley Rai road. In 1916 the factory output totaled $7 420,000. The principal industries are smelte and foundries, automobile works, lumber yard refineries, a tannery, and manufactories of ma chinery, linoleum, masons' materials and novel ties.

Irvington was settled in 1666 as Camptow It received its present name in 1852, and wa incorporated as a town in 1898. The commis sion form of government was adopted in 191 In the city is one of a chain of county park a town hall, a public library, Gladden Lodg Hospital and Bethany Home. W.S.C.

ISAAC, *i'zak,* the name given in the boo of *Genesis* to the son of the Patriarch Abraha and his wife Sarah. Like Abraham, Isaac is figure of the old tradition, but he is a muc more shadowy figure than Abraham or Jacob While many tales which circulated orally a lon time before they were committed to writin are told of Abraham and Jacob, Isaac appear to be overshadowed by his father, on the on hand, and by his son Jacob, on the other. Th only story that specifically deals with an inci dent in the life of Isaac, the adventure wit Abimelech, who came near depriving Isaac o his wife (see *Genesis* XXVI), is a repetition with slight variation, of the similar story tol about Abraham (*Genesis* XX).

Near the beginning of Isaac's career, how ever, we have the beautiful story, in which a least he plays a part, describing how Abraha sent his servant to the old home in Mesopo tamia in order to seek a wife from that plac for his favorite son. The story is most charm ingly told (*Genesis* XXIV), how the servant— whose name is not mentioned—reached th home of Abraham and came to a well about the time when the maidens came out to draw water for the flocks. The servant prayed for divine help to carry out his mission success fully and decided that the maiden who, upon being appealed to, would allow him to drink

out of her pitcher, and would also offer to water the camels accompanying the servant, would be the one destined to be the wife of Abraham's son.

Rebecca, who later proved to be the niece of Abraham, came to the well, and when the servant approached her and asked for water he received, to his amazement, the answer, "Drink, and I will also water thy camels." The servant, overjoyed, then sought out the family of Rebecca and obtained their consent to allow the maiden to go to Palestine and become the wife of Isaac. The meeting of Isaac and Rebecca at the close of the chapter is most charmingly pictured. Rebecca seated on the camel, saw a man coming across the fields and asked the servant his name. He was Isaac. As he approached, Rebecca, according to Oriental custom, dismounted from the camel and covered herself with a veil. The purpose of the tale emphasizes the opposition of the Hebrews towards intermarriage with the Canaanites, but to us there is a charm about it because of the picture of patriarchal life which it unfolds, which is quite independent of its purpose.

By the side of Isaac there is another son of Abraham, known as Ishmael, and born to him by Sarah's maid, Hagar. Isaac and Ishmael represent the traditional progenitors of the Hebrews and Arabs who, feeling the close relationship that existed between them, thus regarded themselves as descendants from one and the same patriarch. The Hebrews, for some reason, recognized the Arabic tribes, or Ishmaelites, as older, and therefore Ishmael is the older son, but Isaac became the favorite; and we also see the national pride of the Hebrews cropping out in making the mother of Ishmael the maid of Sarah. That is the way in which ancient tradition pictures an inferior tribe.

The Arabs, too, have stories about Abraham and Ishmael, no doubt brought to them through contact with the Hebrews, but in these stories Ishmael is always represented as the favorite as well as the older son of Abraham, while Abraham is associated with the traditions of the Arabs, such as the founding of the chief sanctuary of Arabia at Mecca. M.J.

ISABELLA, *iz a bel'a,* **OF CASTILE,** *kas teel'* (1451-1504), the brilliant queen of Castile and Leon, whose marriage to Ferdinand of Aragon in 1469, despite great political opposition, laid the foundation of Spain's future greatness by the union of the two chief Spanish kingdoms. With her husband she waged a ten years' war against the Moors, which ended in 1492 with the capture of Granada and the subjection of all Moorish leaders (see GRANADA). This drove out the Mohammedan religion, leaving Spain an entirely Catholic nation, and it has so been maintained to the present time. Isabella's clear intellect saw merit in the project of Columbus to find a new route to the Indies, and the launching of the enterprise was largely due to her. (See map of Castile and Aragon, page 1218.)

ISAIAH, *i za'ya* (760-680 B.C.), a prophet of Judah, the first of the line of great Hebrew prophets. The name means *salvation of Jehovah.* Most of his prophecies, which he began in the reign of Uzziah, about 740 B.C. and continued through the reigns of the three following kings, were concerning Judah or Jerusalem, where he lived. Those concerning other nations, such as Samaria, Damascus or Philistia, were subordinate and were introduced because of their relation to Zion and the people of God. From the time that Isaiah began his prophetic ministry, he was the adviser of the successive kings. In 734 B.C., when Syria and Israel sought to capture Jerusalem, he declared Jehovah's purpose that they should fail, and he tried to prevent Ahaz from uniting with foreign princes, but his counsel was unwisely refused. When Hezekiah began his rule Isaiah became very prominent in the kingdom, and his opinions on all subjects were received with a great deal of respect. The manner of his death is unknown, although Jewish tradition says he died a martyr.

The Book of Isaiah consists of a series of prophecies, visions and historical events arranged in order of sequence by its author, after whom the book is named. The first part related chiefly to the Jewish nation and its enemies, with predictions concerning Assyria, then at the height of its power, and Babylon, which was just beginning to rise; there were also references to other foreign nations. The second part forecasts the whole period between Captivity and the Messiah's birth. The latter portion is so accurate that Isaiah is often called the "Gospel Prophet," although many eminent German critics think he did not write the last twenty-seven chapters. This has never been determined.

ISHMAEL, *ish'ma el,* Abraham's son, who was driven out into the wilderness with his mother, Hagar, for mocking his young half-brother, Isaac, at a feast. After wandering many days until both were nearly perishing of

thirst, they cried to God, who sent an angel to direct them to a spring hidden among the shrubs. Ishmael married an Egyptian woman and their twelve sons established the tribe called Ishmaelites, as God had promised Abraham (*Genesis* XVII, 20).

ISHPEMING, *ish'pe ming,* MICH., a city in Marquette County, near the center of the Upper Peninsula, fifteen miles southwest of Marquette and Lake Superior. It is on the Chicago & North Western, the Lake Superior & Ishpeming and the Duluth, South Shore & Atlantic railroads, and ships large amounts of iron ore from mines within the city limits and those of the Marquette Range. Gold, marble and building stone are an important part of the city's natural wealth. Ishpeming was settled about 1857, chartered as a city in 1873 and rechartered in 1891. It has the Ishpeming and Lindgren hospitals and a Carnegie Library, and near the city is Lake Michigamme, a summer resort. The area of the city exceeds eight square miles. Population, 1916, 12,448.

ISINGLASS, *i'zin glas,* a tough, whitish, semitransparent substance prepared from the air bladders of certain species of fish and constituting the purest form of animal gelatin (see GELATIN). The best quality of isinglass comes from the Russian sturgeon, but the substance is yielded also by the cod, hake and other fish. In the preparation of isinglass the air bladder is torn from the fish and washed in cold water. Then the black outer skin is removed; the rest is washed and spread on a board to dry, the shiny, inner membrane being turned outward. Best results are obtained when the drying takes place in the sun.

When dry, the bladder is moistened in warm water, and the inner skin removed by rubbing and beating. It is then passed between iron rollers, which reduce it to a thin, partly-transparent ribbon having somewhat the appearance of watered silk. The semitransparent sheets used in the panels of stove doors, and incorrectly known as isinglass, are made of a mineral called mica (which see).

Isinglass is used principally for refining beer and wines. In cooking it is employed as a stiffening for jams and as a basis for jellies and soups. Manufacturers mix it with gum to give luster to ribbons and silk, and an India ink is made by incorporating it with water. Spanish liquorice and lampblack. Isinglass has sticking qualities which make it useful in the manufacture of glue, court plaster, and a cement for mending glass and porcelain.

I'SIS, the chief female deity in Egyp mythology, the sister and wife of Osiris the mother of Horus. She was believe have first instructed the Egyptians in agr ture, and was also credited with the posse of skill in magic and in the art of healing. She is variously represented in art; sometimes crowned with the horns of a cow, her sacred animal, and sometimes wearing upon her head the sun's disk or a small throne, and carrying the lotus scepter. Isis was an object of especial veneration in Memphis and at a later period became popular throughout all of Egypt, Greece and Rome. In latter place her cult was introduced about B. C., but was brought into disrepute by the conduct of the priests, and the authorities m several attempts to suppress it. See OSIRIS

ISIS
A bas-relief, an excel example of Egyptian art.

ISLAM, *is'lam,* or *iz'lam,* the name app by Mohammedans to their religion, wh originated with Mohammed. Its literal me ing is *causing to be sound* or *safe,* or *which makes safe.* However, it is generally cepted as meaning complete submission body and soul to the will of God, or Allah set forth in the precepts believed to have b revealed by Allah to his prophet, Mohamm Western peoples refer to this religion as M hammedanism. See MOHAMMEDANISM.

ISLAND, *i'land,* a tract of land complet surrounded by the water of an ocean, la gulf, bay or river, usually similar to the nea land mass in respect to physical characteris and plant and animal life.

Oceanic Islands, such as the Hawaiian gro lie in the open ocean far distant from a co nent, and not connected in any way with They are either composed of coral reefs, b of the limy framework of coral animals, or masses of land and lava thrown up by deep-sea volcanoes. The former occur o in warm regions, but the latter may be fo

in any zone, and sometimes disappear as suddenly as they originated.

A group of islands is called an archipelago.

Continental Islands, so called because they lie near a continent, are the mountain peaks of sunken ranges or portions of the continent which are partially covered by the sea. The British Isles are examples of this form; it is certain that at one time they were joined to the mainland of Europe.

Floating Islands are found in inland waters, formed of great masses of earth, driftwood and intertwined roots, and are sometimes large enough to be used as gardens and pasture lands. Artificial floating islands are made by covering reed rafts with mud, and in China are commonly used for planting rice beds.

Some Islands of Special Interest. The six largest islands in the world, and their approximate areas, are given in the following table:

Greenland	827,300 square miles; nearly four times the area of France.
New Guinea	300,274 square miles; nearly equal to Texas and Kentucky combined.
Borneo	289,860 square miles; five times the combined area of England and Wales.
Baffin Land	236,000 square miles; about one-third the area of the province of Quebec.
Madagascar	228,000 square miles; more than the combined area of North Dakota, South Dakota and Nebraska.
Sumatra	180,000 square miles; three times the combined area of Maine, Vermont, New Hampshire and Massachusetts.

Cuba and Haiti, the two largest islands of the West Indies, are the only islands of that group which are politically independent. The Hawaiian and Philippine groups, both of which belong to the United States, and the Dutch East Indies, are among the most important of all the world's islands from a commercial standpoint. The small island of Elba, in the Mediterranean, and Saint Helena, in the South Atlantic, have undying historical interest, for each was the scene of the exile of Napoleon Bonaparte, and on the latter island he died.

Related Subjects. The following islands are given special description under their titles in these volumes. They are here classified according to the countries to which they belong:

AUSTRIA-HUNGARY

Franz Josef Land (ownership in doubt)

CANADA

See under *Great Britain,* below

CHILE

Juan Fernandez
Tierra del Fuego

DENMARK

Faroe Islands
Greenland
Iceland
Zealand

ECUADOR

Galapagos

EGYPT

Philae

FRANCE

Corsica
Guadeloupe
Madagascar
Marquesas
Martinique
Miquelon
New Caledonia
New Hebrides
Réunion
Saint Pierre
Society Islands

GERMANY

Admiralty
Bismarck Archipelago
Helgoland
Ladrone
Samoa

GREAT BRITAIN

Alderney
Antilles
Antipodes
Bahama Islands
Barbados
Bermuda
Borneo
British Isles
British West Indies
Ceylon
Channel Islands
Cyprus
Falkland Islands
Fiji Islands
Great Britain
Guernsey
Hebrides
Hong-kong
Ireland
Jamaica
Jersey
Laccadive Islands
Leeward Islands
Maldive Islands
Malta
Man, Isle of
Mauritius
Newfoundland
New Guinea
New Hebrides
New Zealand
Nicobar Islands
Norfolk Island
Orkney Islands
Penang
Saint Christopher
Saint Helena
Saint Vincent
Scilly Islands
Shetland
Singapore
Solomon Islands
Tasmania
Tonga Islands
Trinidad
Wight, Isle of
Windward Islands
Zanzibar

CANADA

Anticosti
Cape Breton Island
Magdalen Islands
Manitoulin Islands
Prince Edward Island
Queen Charlotte Islands
Sable Island
Thousand Islands
Vancouver Island

GREECE

Aegina
Crete
Cyclades
Delos
Euboea
Ionian Islands
Ithaca
Melos
Salamis

ITALY

Capri
Elba
Monte Cristo
Patmos
Sardinia
Sicily

JAPAN

Formosa
Kurile Islands
Loo-Choo
Saghalien

THE NETHERLANDS

Borneo	Moluccas
Celebes	New Guinea
Curacao	Salayer Islands
East Indies, Dutch	Sumatra
Java	Sunda Islands

NORWAY

Lofoten

PORTUGAL

Azores	Madeira
Cape Verde Islands	

RUSSIA

New Siberia Islands	Nova Zembla

SPAIN

Balearic Isles	Majorca
Canary Islands	Minorca

TURKEY

Rhodes

UNITED STATES

Aleutian Islands	Mare Island
Blackwell's Island	Martha's Vineyard
Catalina	Melville Island
Dry Tortugas	Molokai
Ellis Island	Nantucket
Florida Keys	Oahu
Governor's Island	Philippine Islands
Guam	Porto Rico
Hawaii	Pribilof Islands
Isle Royale	Saint Thomas
Long Island	Staten Island
Mackinac Island	Sulu Islands
Manhattan Island	Unalaska
Manitoulin Islands	West Indies, Danish

INDEPENDENT

Cuba	Haiti
Isle of Pines	Santo Domingo

GENERAL ARTICLES

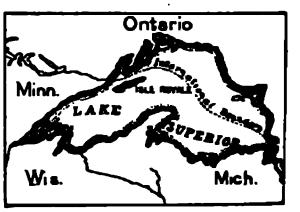
East Indies	Oceania
Malay Archipelago	West Indies

ISLE OF PINES, a beautiful, wooded little island of the West Indies, especially attractive to tourists and settlers on account of its delightful climate and far-famed mineral springs. It is located in the Caribbean Sea, thirty-five miles south of Cuba, to which it belongs. The northern part of this almost circular island is hilly and covered with pine, cedar and mahogany; it has sandy soil especially favorable to the growth of pineapples and potatoes. The southern part is mainly a low marsh, much like the Everglades of Florida. Although there are various mineral deposits, marble quarries are the only portions developed for commercial purposes. Cattle raising is the chief occupation of the inhabitants, but citrus fruits are important sources of wealth. The island has an area of 840 square miles, but the population of over 4,000 is centered chiefly in the capital city, Nueva Gerona, and the town of Santa Fé, where there are modern hotels and sanatoriums. In proportion to population there are more Americans in the island than in any other island off the American coast. Unsuccessful attempts were made after the Spanish-American War in 1898 to bring the island under the control of the United States, by purchase.

ISLE OF PINES
Showing its location with respect to Cuba and the mainland of the United States.

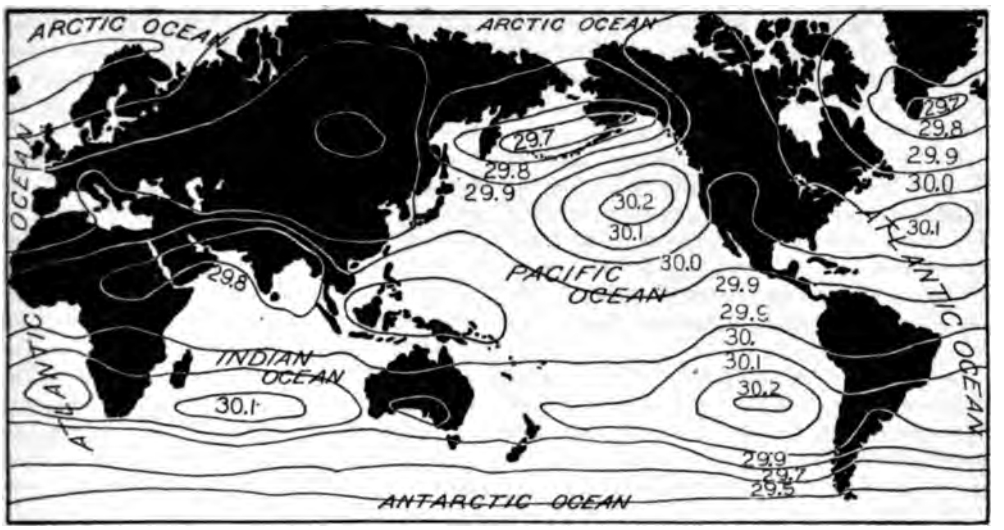
ISLE OF WIGHT, *wite.* See WIGHT, ISLE OF.

ISLE ROYALE, *ile roy'al,* the largest of a group of small islands in Lake Superior, named for the largest island. They formerly constituted a county, but now form a part of Houghton County, Mich. Isle Royale, which is known principally as a summer resort, is about forty-five miles long and nine miles wide, and has an area of 229 square miles. It contains rich copper mines on the sites of old mines which have been worked by the Indians, and the shores afford excellent fishing grounds. The island is about eight hours' ride by steamer from Duluth, Minn., but is nearer to Port Arthur, Ont. The international boundary parallels the north shore, about eight miles distant.



LOCATION MAP

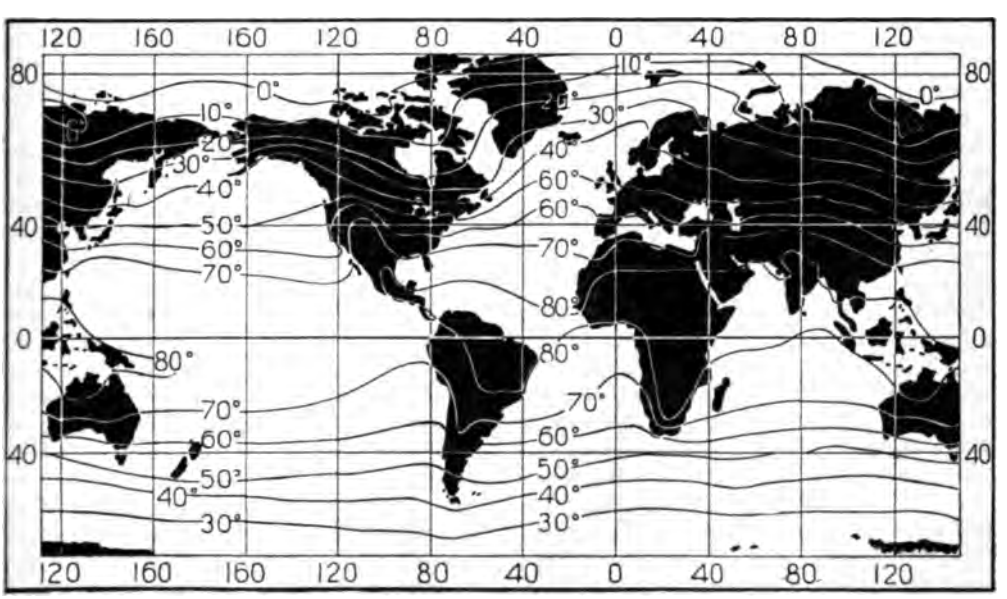
ISOBARS, *i'so bahrz,* or **ISOBARIC,** *i so bahr'ik,* **LINES,** are lines drawn on weather charts connecting places having the same atmospheric pressure (see BAROMETER). *Isobar* is from two Greek words meaning *equal* and *weight.* Charts showing the areas of high, normal and low pressure are extremely useful in forecasting the weather, for winds blow toward areas of low barometer, and the direction and velocity of storms can be foretold with considerable accuracy by reference to isobaric lines. The pressure is marked in inches and tenths of an inch. An isobaric map may show the average pressure throughout the year, or for any shorter periods. The weather bureaus of various countries issue charts each day showing atmospheric conditions. See WEATHER BUREAU; AIR.



ISOBARIC LINES, SHOWING DAILY AVERAGES FOR A YEAR

ISOCRATES, *i sok' ra teez* (436-338 B.C.), born at Athens, was one of the ten notable orators of Attica, and was distinguished as a teacher of rhetoric and oratory. Twenty-one of his orations are still in existence; they are remarkable for their polished style and careful construction. Isocrates was the first to recognize the value of oratory in public life.

ISOTHERMAL, *i so thur' mal,* **LINES,** or **ISOTHERMS.** The word *isotherm,* which means *equal heat,* is the name applied to lines drawn upon maps to connect places having the same average temperature. To construct a monthly isotherm map, the geographer must average all the temperatures observed during the month to find the mean temperature for the month and connect the places having the same average. The average temperatures of the year would similarly furnish the basis for a yearly map. Since places having the same latitude often vary in temperature (see CLIMATE), isothermal lines are extremely irregular. This is true especially of those in the northern hemisphere, where the great land masses are



ISOTHERMAL LINES, SHOWING DAILY AVERAGES FOR A YEAR

broken by large water areas, for temperatures vary on land and seas in the same latitude. In the southern hemisphere, where the oceans are of much greater extent, the isotherms follow more closely the parallels of latitude.

A line drawn near the earth's equator, through the middle of the belt which has the hottest climate, is called the *heat equator.* This isotherm connects places having an average temperature of about 80° F. The daily charts issued by the weather bureaus of various countries contain isothermal lines. See WEATHER BUREAU.

ISPAHAN, *is pa hahn',* formerly the capital and now one of the large cities in Persia, is situated on the Zendehrud River, over 200 miles south of Teheran, the present capital. It is one of the oldest cities in Persia, and anciently was one of the most magnificent in Asia. Only a small part of the city is now inhabited, the greater part being occupied by ruined castles, mosques and schools, monuments of former splendor. Notable among these is the celebrated Mesjid-i-Shah, or "royal mosque," a magnificent example of Oriental architecture. One of the most remarkable structures is a bridge across the Zendehrud over 1,000 feet long, resting on thirty-four arches and surmounted by arched galleries. The town is of commercial importance on account of its situation on the main route from Abushehr to Teheran, and it is active industrially, the chief manufactures being pottery, arms, gold and silver wares and cotton and woolen goods. Its principal exports are tobacco, opium, rice and rugs. Population, estimated at 80,000.

ISRAELITES, *iz'ra el ites.* See JEWS.

ISRAELS, *ees rah els',* JOSEF (1824-1911), the great regenerator of Dutch art. He chose to present pathetic scenes in the lives of the humbler classes of Holland, notably its fisherfolk, and his subjects touch the hearts of all who view his canvases. He was born at Groningen, of Jewish parentage. After studying at Amsterdam and at Paris, he started out as an historical painter, but soon turned to the portrayal of tragic incidents in the lives of the poor. Although he knew but little of the life of fisherfolk until he was past the age of thirty, many of his important pictures were painted while he lived in luxury at The Hague, the most notable of these being *The Sewing School at Katwijk, Silent Company, Fine Weather* and *The Struggle for Life.* Among several canvases in American galleries is his *Frugal Meal,* now a part of the Vanderbilt collection in the Metropolitan Museum, New York. He also showed great skill as an etcher, his plates being as simple and direct as his paintings.

ISTHMIAN, *is'mi an,* **GAMES,** one of the four national festivals of ancient Greece, in which trained athletes wrestled and boxed, raced and threw the discus. These games were held in the southern part of the Isthmus of Corinth, close by a temple sacred to Poseidon (Neptune), in whose honor they are thought to have originated. After 582 B. C. they were held regularly in the spring of the second and fourth years of each Olympiad, or the four-year period between the Olympian games. The ancient Greek prizes were palm branches and wreaths of parsley; later the Romans substituted prizes of wreaths of fir. The site of these ancient games is now occupied by the modern town of Isthmia; in the vicinity may still be seen traces of the old stadium. See OLYMPIAN GAMES.

ISTHMUS, *is'mus,* from a Greek word meaning *neck,* is a term applied to a narrow strip of land connecting two continents, or a peninsula and the mainland. An isthmus is frequently a barrier to commerce, a condition which was responsible for two of the largest canals in the world. European merchant craft could find no shorter way to India than around Africa until the building of the Suez Canal, which cut the isthmus connecting Africa and Arabia. Similarly, the Isthmus of Panama, connecting the two Americas, made it necessary for boats to sail around South America until the Panama Canal was constructed. See PANAMA CANAL; SUEZ CANAL.

The Isthmus of Corinth, connecting Morea (the Peloponnesus) with Northern Greece, and the Isthmus of Kra, connecting the Malay Peninsula with Siam, are other well-known necks of land. On the former the ancient Greeks were accustomed to celebrate the Isthmian games (which see).

ITALIAN, *i tal'yan,* **LANGUAGE,** perhaps the most musical and poetic of all the languages of modern Europe. It has few of the narrow, closed vowel sounds which English has in such plenty in words like ***met, sat*** or ***tin,*** and its broad, open sounds and vowel endings make it a joy to singers. Many of the world's greatest operas are written in it, and even those hearers who do not understand the language can feel the charm of the liquid sounds. Grand opera singers, even those who have acquired only a superficial knowledge of the tongue, prefer to sing in it rather than in

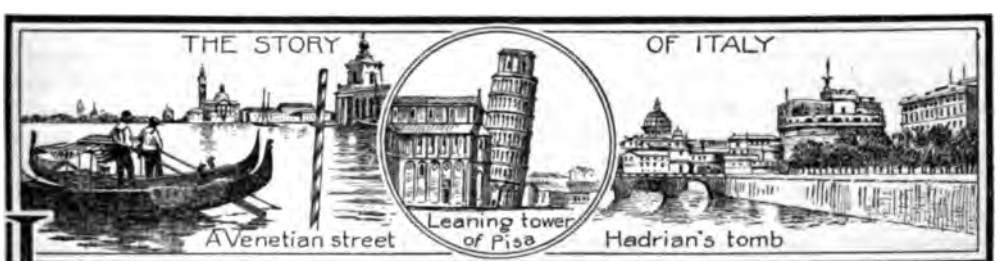
any other language, as it displays more perfectly the possibilities of the voice.

Of poetic words Italian has a vast store, but of words descriptive of the ordinary material things which play so large a part in modern life it has fewer than most modern languages. This is due not only to the poetic and artistic temperament of the Italians, but to the fact that their language crystallized first in the writings of the poet Dante, who lived in the late thirteenth and early fourteenth centuries. Since that time the language has changed comparatively little. The significance of this fact is evident, if the state of the English language at that time is considered. Chaucer lived later than Dante, but the modern Englishman can scarcely read the works of Chaucer without special study.

Literary Language and Dialects. Any language which has been used for a long time over a considerable area is bound to have dialects, but those of Italy are more distinct from the literary language than those of most other countries. The Italian literary language is the same everywhere, but when most Italians, except those of Tuscany, write poems or novels they are writing in what is practically a foreign tongue; for only in Tuscany and in part of the immediately adjoining provinces is this literary language commonly spoken, even in the homes of educated people. A peasant of Calabria, in Southern Italy, can no more understand the everyday speech of Tuscany than an American can understand Spanish. The cultured people everywhere at least understand Tuscan, but when they speak it, it is an altered Tuscan, affected by the idioms and peculiarities of their dialect. Nor is it the inhabitants of Tuscany themselves who pronounce the language most perfectly. Tuscan on the lips of a cultivated inhabitant of Rome—that is the ideal. Such a combination is said to be almost as musical as singing.

History of Italian. Italian is one of the Latin tongues, along with Spanish, French and Portuguese; but the fact that it has grown up on the soil where Latin flourished does not mean that it is a direct lineal descendant of Latin. Some scholars maintain that it is derived from a dialect which existed all the time in the Roman state, side by side with the dominant Latin; others that it has descended from the classic Latin through that language of the common people, *Romana rustica,* or *rustic Latin,* which grew up after the decline of the literary language. However that may be, by the thirteenth century Tuscany had developed its language practically as it stands to-day, and it was the use of this tongue by poets in that century which determined its dominance as the literary tongue. It must be understood that Dante did not formulate modern Italian, any more than Luther in his translation of the Bible formulated modern German; he simply gave one special dialect precedence over others by writing in it something which people of all dialects wanted to read.

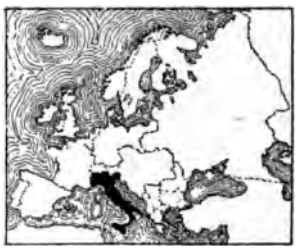
A.MC C.



ITALY. "Open my heart," wrote Robert Browning, "and you will see, graved inside of it, *Italy.*" There is probably no other country toward which the hearts of the people of other lands turn so affectionately as toward this peninsula of the blue Mediterranean. It has given to the world so much beauty, and holds in trust so much more in its galleries, museums and churches; its blue sky and blue waters and bright sunlight breathe so much of the joy of life; its historic and religious associations are so compelling that even those who have never visited it but who read about it can feel its thrill. It is the Mecca toward which many a traveler's thoughts turn, and the oft-quoted "See Naples and die," might well be "See Italy and die," so truly is it the land of the beauty-loving tourist.

What the Map Shows. Its position is peculiarly favorable. Comprising the central of the three great peninsulas which extend southward from Europe, it has about it, on all sides

except the north, the waters of the Mediterranean Sea or its great branches, the Tyrrhenian and Adriatic seas; while to the north it is shut off from the Continent and protected from sweeping northerly winds by the great barrier of the Alps. The territories of Switzerland, Austria-Hungary and France touch it on its northern and northwestern frontiers, but everywhere else there is water; and what this has meant to the history and development of Italy may be understood only when the vast importance of the Mediterranean as a trade route through the stretch of centuries is comprehended. The peninsula itself is boot-shaped, and just at the toe is the "football" of Sicily, which with Sardinia, Elba and smaller islands makes up a part of the Italian kingdom. A glance at the map will show how nearly the peninsula, with its prolongation, Sicily, forms a bridge across the center of the Mediterranean from Europe in the direction of Africa.



LOCATION MAP
Showing the place of Italy in the continent of Europe and the proportionate amount of the land surface it covers.

The greatest length of Italy from northwest to southeast is 708 miles; its greatest breadth, in the far northern, or mainland, portion, is 354 miles; but the chief part, the peninsula itself, nowhere exceeds 150 miles in width, and has an average width of about 100 miles. Not counting the islands, its area is 91,161 square miles, a little less than the combined areas of New York and Pennsylvania; with the islands, it has an area slightly greater than that of Nevada, 110,845 square miles. Its latitude, from 38° to 46° 40′ north, is about that of the American coast from Delaware to Maine, but Italy is an almost tropical country, knowing nothing of the rigors and sudden changes of the New England climate.

The People of Italy

Their Characteristics. Italy is racially of purer stock than the most of the European nations; that is, a large proportion of its inhabitants are Italians. But between the natives of one part of the country and those of another there are very distinct differences. No physical description can be given which will fit them all, but the commonest type is that most familiar to dwellers in America, or any other country to which Italians emigrate in numbers, the dark-haired, dark-skinned type, rather short of stature. Men as well as women are likely to be very good-looking in their youth, but they age rapidly, especially the women, and the injunction to "Look well at the mother before wedding the daughter," might well frighten a suitor who had fixed his fancy on a slim, smooth-cheeked Italian girl.

As a race, the Italians are passionate and hot-blooded, prone to avenge a fancied insult without waiting for explanation. Statistics show that almost twenty times as many murders in proportion to population take place in Italy as in England, and more than in any other country of Europe, save perhaps Spain. It is the inhabitants of Southern rather than of Northern Italy who display in greatest measure this passionate spirit—those apparently stolid Southern peasants whom only a personal injury can rouse quickly.

The love of beauty, whether of nature or of art, is inborn in most Italians, who have behind them the traditions of a long line of artists unsurpassed in the world's history. The lower classes of most countries care little for pictures, but the art museums of any large city will show on Sundays or holidays a goodly proportion of Italian laboring men, poorly clad, perhaps, but looking at great pictures with intelligent and appreciative eyes.

How They Live. Italy had at the last census (1911) a population of 34,671,377, ranking a little below France and sixth among the European countries. As to density of population, England, Belgium and the Netherlands surpass it, Italy having an average of 318.8 people to the square mile. In some parts of the kingdom the population is largely rural, in others the large proportion of the people live in cities and towns; but in general it may be said that only about one-ninth of the population is in cities of 100,000 or more. There are no such vast cities as London or New York, for instance, but Rome, the capital; Naples, Milan, Turin, Palermo, Florence, Catania, Venice, Messina, Leghorn and Bari, have each more than 100,000 inhabitants. All of the most important cities are described in these volumes.

In the main, Italians are sober and thrifty, and very willing to work; but conditions in

their home land have been in many ways against them. The land system being designed chiefly for the benefit of landlords, and the methods of cultivation being antiquated, the agricultural class has suffered, while the industrial class has had a more unenviable position than anywhere else in Europe. Taxation, too, is burdensome and living conditions are far from hygienic, whether it be in the cities, where proper sanitary measures are lacking, or in the country, where wide-spreading marshes breathe malaria. The result of all these conditions has been that Italians have made up about half of that great number of emigrants who have crossed the seas to find new homes in America. For a time Brazil and Argentina received most of them, but in recent years the tide has turned more strongly toward Canada and the United States, which recently have been receiving 300,000 or more a year. Most of them are of the peasant or laboring classes, who in their new homes have to content themselves with performing unskilled labor.

COMPARATIVE AREAS
Italy, including its islands, has 110,845 square miles of territory; Nevada has 110,690 square miles.

Social and Political Conditions. It is only recently that the laboring classes of Italy have had even the beginnings of fair play, so burdensome have conditions been. Organizations along different lines from the labor unions, but with somewhat the same purpose, have accomplished much in the way of bettering factory conditions, increasing wages, shortening hours, and putting through legislation which in a measure controls child labor. Although these laws are neglected oftener than they are enforced, they indicate an upward trend.

Education. Educationally, too, Italy is behind the other great countries of Europe. Under the new kingdom, laws were passed in 1877 providing for free and compulsory education of children between the ages of six and nine, and this has bettered conditions somewhat, but since in many provinces the laws are not enforced there is still much to be desired. In the northern provinces the percentage of those unable to read and write is comparatively low —in some of them as low as five per cent; but in the south there are still regions where three-fourths of those who present themselves to be married are unable to sign their own names.

The national system of education, which would be more effective were other drains on the national resources less severe, includes kindergarten, primary, grammar and secondary schools, and higher institutions. Whatever may be said of elementary education in Italy, higher education is well provided for. There are twenty-one universities, seventeen under state control, and to these annually flock over 22,000 students; but they study mainly subjects which will prepare them for a government position. Engineering, agriculture, commerce and the like are neglected. Normal and technical education is also much neglected, but there are numerous institutions for art instruction.

Of recent years an Italian educator, Madame Montessori, has attracted much attention by her advanced "natural" methods, and schools all over the world have adopted her methods, with modifications. See MONTESSORI METHOD.

Language. See ITALIAN LANGUAGE.

Art. Except ancient Greece, no other country has played so large a part in the history of art as has Italy. No other painters who have ever lived are worthy to stand beside the great masters whom Italy produced in the dawning days of her modern period, and there were years, centuries even, when no painter considered himself educated unless he had studied in Italy. In the articles PAINTING and SCULPTURE there are subheads which treat historically of the place of Italy in the world of art.

Religion. Few countries in all the world are so unified religiously as is Italy, for here, at Rome, is the center of the Roman Catholic Church, and to that communion most of the people of Italy belong. There are, it is estimated, only about 65,600 Protestants and 35,600 Jews in the country. Since the establishment of the new kingdom there has been friction between the government and the Church, the Pope steadfastly asserting the claim of the Church to the possession of certain extensive territories, which the government as firmly denies. As a result the Pope insists on considering himself a prisoner in the Vatican, and only under protest admits the right of the government to pass on the appointment of bishops and archbishops. There appears, how-

ever, a better understanding developing between these temporal and spiritual powers.

Colonies. All of the dependencies, which have a total area of about 591,200 square miles and a population of 1,400,000, are in Africa. The largest and most important of them is Tripoli, invaded in 1911

by Italy and ceded in the following year by the Turks. Its area is 406,000 square miles, its population in 1911 was 523,175. The other colonies are Eritrea, valuable because of its 670 miles of frontage on the Red Sea, and Italian Somaliland. These dependencies are not so organized that they are

self-supporting, and the home government must contribute each year large sums from its overburdened treasuries.

Transportation and Commerce. Italy has in operation slightly over 11,000 miles of railway —less than any other large country of Europe; but this is in part accounted for by the fact that few trunk lines connecting with other countries are necessary, so admirable are the water facilities. One railway system operates on the east, one on the west of the Apennines, and the government controls over three-fourths of the total mileage.

The merchant marine is large, as befits a nation with a long maritime history, but it has no longer the dominating place among the merchant marines of Europe which it possessed for centuries. Italian commerce increased rapidly during the early part of the twentieth century, and now it amounts in a year to almost a billion and a quarter dollars. The imports, of which the most important are coal, cotton, cereals, machinery and timber, amount to more than the exports, which include silk, fruit, wines and art objects. Before the War of the Nations, which began in 1914, Germany held first place for years in both the import and the export trade of Italy, the United States and Great Britain ranking next. The total trade with the United States amounts in a year to more than $130,600,000.

Government. The kingdom of Italy, as such, has never had a constitution drawn up for its guidance, but it adopted bodily that of Sardinia, which was the nucleus of the united nation. There is much in the government like that of England; that is, Italy is a hereditary constitutional monarchy, with a responsible ministry and a legislature of two houses. In theory the king has many powers; in practice, he exercises very few of them save in relation to foreign affairs, never even assuming the right to veto parliamentary bills. The real executive power lies with the Cabinet of eleven members, which plays an even larger part in governmental affairs than does the English Cabinet. It is usually chosen from members of the lower house, though not necessarily so, and being responsible to Parliament, must resign when any of its important measures are defeated.

The upper house of the legislature, the Senate, is made up of an indefinite number of prominent men appointed for life by the king. At present there are almost 400 Senators. The lower house, in which most of the legislation originates, has 508 members, chosen by popular vote for a term of five years. Since 1912 there has been practically universal male suffrage; all citizens between the ages of twenty-one and thirty are allowed to vote if they can read and write, and all above the latter age have the same privilege without that qualification.

The judiciary of Italy, as well as the system of local government, is patterned largely upon that of France.

The Land and Its Resources

Coast and Surface. Italy proper has a coast line of about 2,270 miles, which the islands bring up to 4,160; and the slenderness of the long peninsula means that no place is more than about sixty miles from the sea. The most beautiful section of the coast is the western, which is high and rocky, save in the occasional places where marshes run down to the sea, and which possesses a number of excellent harbors. The southern coast, too, is bold and picturesque, but on the east there are great stretches of sand, and fine harbors are few. Because it is a country with a famous maritime history, Italy has massed a considerable proportion of its population near the coasts.

The mountains of the mainland fall into two groups, the Alps, to the north, and the Apennines, the "backbone," which run the entire length of the peninsula. The highest summits of the Alps do not lie in Italy, but the Italian Alps present some exquisite scenery, with the snow-crowned peaks, sheer drops to the plains of the Po, and beautiful blue lakes. The Apennines are not one of the world's great mountain systems as regards height, nowhere attaining a greater altitude than 9,580 feet; but their ruggedness gives them a peculiar strength and dignity, and much of the same appeal possessed by far more lofty ranges (see APENNINES). With their various systems they divide Italy into an eastern and a western slope, nowhere having plains of any considerable extent between their borders and the sea.

Since the islands of Italy, too, are mountainous, the only large plain is that of the Po, in Lombardy. This is shut in by a great curve of the Alps, and has an extent of about 37,000 square miles. It is here, chiefly, that agriculture and other industries flourish, and here that the population is densest.

Rivers and Lakes. The only large river of the kingdom is the Po, into which the melting snows of the Alps and the rains of the Apennines pour their floods. This does not mean that Italy is not well watered, for it has many smaller streams, including the Adige, the Arno, the historic Tiber, the Brenta and the Tagliamento. Some of these are but mountain streams, rushing torrents in the season of rains, but dry gullies during the heat of summer.

Italy has to-day but one active volcano, Vesuvius, the only one, indeed, in Europe; but that it once had many more is proved by the abundance of craters, a number of which now contain lakes. The most famous of Italy's many lakes, however, are the Alpine lakes of Garda, Maggiore and Como. The first is the largest, the second the best known, the third the loveliest; indeed, it is doubtful whether in all the world there is a more beautiful body of water.

Climate. This is one of the great assets of Italy, and also one of its drawbacks. The air is remarkably clear, the sky dazzlingly blue, and there is a large proportion of sunny days. There are, on the other hand, sections in which every breath is laden with pestilential vapors from the marshes. In general, the climate is temperate, and extremes of heat and cold are not great. The northern part, where the influence of the sea is least felt, has the largest temperature range, whether annual or daily, the southern part of the peninsula and Sicily varying but 25° between summer and winter. Indeed, this southern portion with its hot, dry winds (see SIROCCO) is more like Africa than like Europe.

Some districts have a heavy snowfall and almost everywhere there is a rainfall that would be sufficient for agriculture did it not occur chiefly in the fall and winter months. As it is, irrigation must be practiced almost everywhere.

Mining. So mountainous a country might be supposed to have large mineral wealth, but this is not the case. Such resources as there are, moreover, are hampered in their development by an almost total absence of coal. But Italy is rich in one mineral product, for it furnishes the great proportion of the world's supply of sulphur. Most of this comes from Sicily, while most of the zinc and lead is mined in Sardinia and most of the iron in Elba. Copper, quicksilver, and a little gold, silver and antimony complete the list of metals, but there is one nonmetallic mineral product for which Italy is famous the world over—its beautiful Carrara marble (which see).

Manufactures. Only in comparatively recent years has Italy had any standing as a manufacturing country, and even to-day it does not rank high industrially. In the northern part of the country there is one thriving and characteristic industry, the production of silk; hundreds of thousands of people are engaged in growing the silkworms, and many more in the spinning and weaving. Browning is quite accurate when in his *Pippa Passes* he makes his little silk weaver live in Asola, for Lombardy is one of the chief homes of the silk industries. Other textiles, cotton, woolen and linen, are manufactured also, and a great quantity of straw goods, such braids as Leghorn and Milan being used the world over for hats.

But perhaps the most characteristic manufactured products are such artistic articles as ivory carvings, marble and alabaster pieces, mosaics, enamels, jewelry and fine pottery, for the making of which the Italians, with their highly developed art sense, have a special aptitude.

Agriculture. This is by all means the foremost industry, and the range of latitude in the long peninsula makes it possible to grow many different crops. Even though the country is mountainous, over seventy per cent of the land is productive, and at least sixty per cent of the people are engaged in agriculture. Marshes have been drained, semidesert lands irrigated, and the growing area has thus been materially increased in recent years. The great plain of the Po, in Lombardy, is the most important agricultural region; it is now one of the most fertile sections in the world.

Of all the products, fruits of various kinds are most important. Almost one-sixth of the entire area of the country is under vines, and although Italian vine growers, like the French, have had to fight against the troublesome disease known as phylloxera (which see), vine-culture is increasing. Billions of gallons of wine are made each year, but much of it is of an inferior quality. Scarcely less important than the vine is the olive tree, in the growing of which Italy is the chief country in the world. Oranges and lemons of most excellent quality thrive in the warm, sheltered regions; Sicily and Sardinia have great groves of almonds, and figs, dates, melons, almost all subtropical fruits, in fact, are grown in large quantities. Corn on the northern plain, and wheat in the more southerly regions, are the chief grains, though

BEAUTIFUL LAKE GARDA.

Characteristic of the scenery on the Italian frontier. In 1916 in the War of the Nations the Austrian and Italian armies were at opposite ends of this lake preparing for battle.

rice, barley and oats are of increasing importance. Beets are grown in large quantities for sugar, and vegetables of various kinds sufficient to supply the home demand. A very special importance attaches to the growing of the mulberry tree, on which feed the myriads of silk worms which are the basis of one of Italy's chief industries.

With fertile soil and a favoring climate, it would seem that the farmers of Italy were a highly favored class, but most of them are painfully poor, despite their industry, for the land is held chiefly by wealthy landlords, and the terms on which it is let are far from advantageous to the tenants, who receive only a small portion of the output.

Only in northern Italy, which is in general far more advanced and progressive than the southern portion, is stock raising carried on scientifically. From this dairy region come those famous varieties of cheese, the Parmesan and Gorgonzola.

History of Italy

The Middle Ages. Not always has the peninsula of Italy been a united nation, nor can its entire history be treated under the title *Italy*. Until 476, when Rome fell before the barbarians, the history of Rome was the history of Italy (see ROME, subhead *History*), but Odoacer, who set up his government on the ruins of the empire, called himself not emperor of Rome, but king of Italy. In 493 Theodoric the Great, king of the Ostrogoths, overthrew Odoacer, and until 526 ruled wisely and well, giving to Italy such a period of prosperity as it did not see again for centuries.

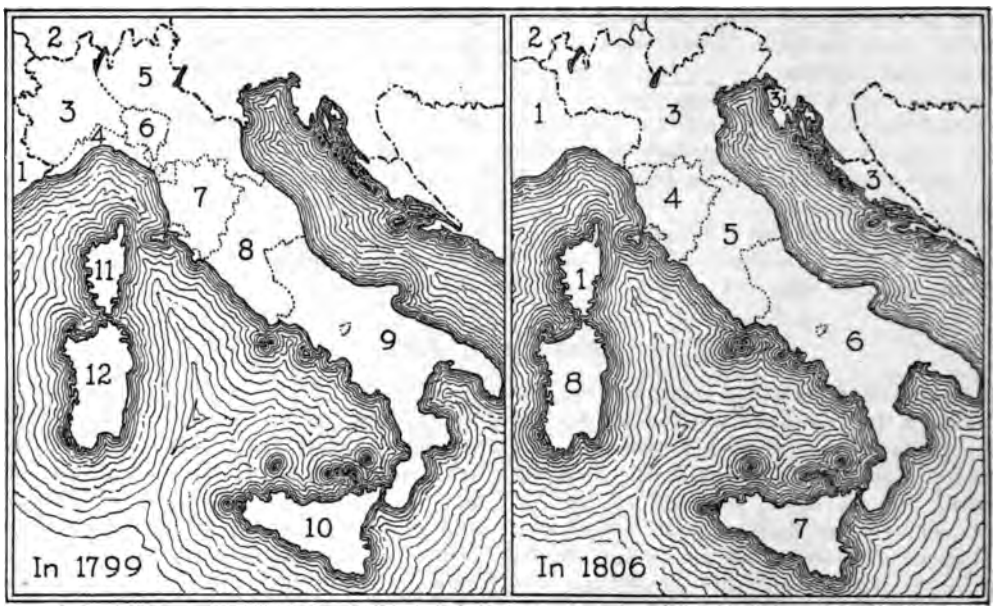
For a time after the downfall of the last Gothic king in 552, Italy was a dependency of the Byzantine Empire (which see), but the boundaries of the Byzantine territory in the peninsula continually contracted before an advancing Germanic tribe, the Lombards. Finally, these invaders threatened Rome itself, and the Pope called to his aid Pippin, leader of the Franks, who checked the Lombard advance. Charlemagne, Pippin's son, completed the conquest of the Lombards and had himself crowned with the famous Iron Crown (see CROWN, subhead *Iron Crown of Lombardy*). He also confirmed the gift of certain lands which his father had given to the Pope; this was an event of great moment, since it marks the beginning of that temporal power of the Popes which brought about such lasting controversy. Charlemagne's assumption in 800 of the title of emperor resulted in those claims of the German emperors on Italy which wrought such great hardship for both countries in the centuries that followed. See CHARLEMAGNE.

Division and Anarchy. The Treaty of Verdun in 843 gave Italy to Lothair, but no settled government followed, Greeks, Saracens, great nobles, almost any ambitious party that arose working its will upon the country. Otto the Great, crowned Holy Roman Emperor in 962, put an end to this period of anarchy, and throughout the Middle Ages the emperors were the nominal rulers of Italy. Resenting this rule by the Germans, however, the Italians stirred up constant revolts, and many of the emperors had to fight hard to maintain their authority. But the strongest opponents the emperors had in Italy were the Popes, who resisted firmly any imperial attempts to lessen the Papal power.

Period of City States. Meanwhile a new force was arising in Italy—the city states—which for a time made in large measure the history of the peninsula. Milan, Genoa, Florence, Pisa, Venice and other cities made themselves practically independent, and about them as centers a brilliant life grew up (see CITY STATES). Resisting not only the nobles who sought control over them, but the emperor himself, they flourished and grew strong, and this might have been a period of glory and prosperity for Italy had it not been for the feuds and rivalry of those two famous factions known as the Guelphs and the Ghibellines (see GUELPHS AND GHIBELLINES). In every city the struggle raged, and only as some powerful family of nobles made itself supreme in each city and established a despotic government was even a measure of peace secured.

The power of the emperors had greatly decreased and in the south had been replaced by a new authority, that of France; for in the latter half of the thirteenth century Charles of Anjou, the brother of the French king, had set up for himself a realm known as the Two Sicilies (see SICILIES, KINGDOM OF THE TWO). French rule proved too despotic, however, and later in the century Sicily and Naples submitted themselves to Aragon, in Spain.

Age of Invasions. This age of the despots, as it is called, when the cities with such men



HOW NAPOLEON ORGANIZED ITALY

(1) France
(2) Switzerland
(3) Piedmont
(4) Ligurian Republic
(5) Cisalpine Republic
(6) Duchy of Parma
(7) Grand Duchy of Tuscany
(8) Roman Republic
(9) Parthenopean Republic
(10) Kingdom of Sicily
(11) Corsica
(12) Sardinia

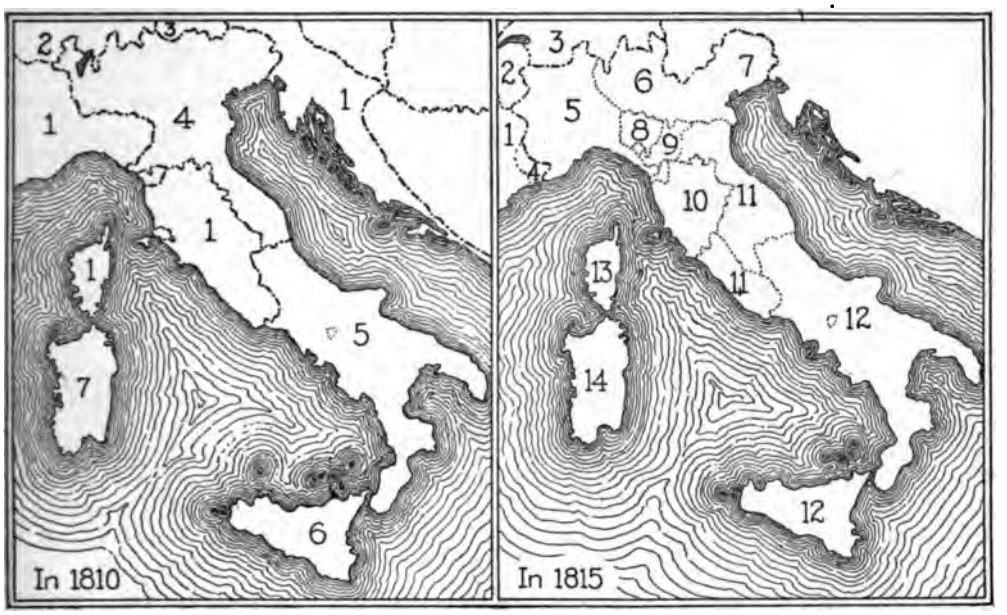
WHEN NAPOLEON WAS KING OF ITALY AND JOSEPH BONAPARTE WAS KING OF NAPLES

(1) France
(2) Switzerland
(3) Kingdom of Italy
(4) Kingdom of Etruria
(5) Papal States
(6) Kingdom of Naples
(7) Kingdom of Sicily
(8) Kingdom of Sardinia

as the Florentine Medicis at their head were really the only important part of Italy, lasted from the middle of the fourteenth to the end of the fifteenth century. Then, just as the modern age was really beginning for the world, just at the time when the Western hemisphere was being discovered and explored, a change came for Italy. It became the prey, not of ambitious princes within, but of ambitious countries without. The German emperors, renewing their efforts to gain the old ascendancy, were opposed by the kings of France, of whom the first actually to invade Italy was Charles VIII. He entered the peninsula in 1494, made himself master of Naples, and was crowned king there. On his withdrawal his influence practically ceased, but he had turned the attention not only of France but of other nations to Italy, which seemed a prey too feeble to resist invasion. French kings and Spanish kings seized what territories they would, the petty states of the peninsula being too selfish to unite in the common defense.

But a stronger ruler than any mere French king was coming to the fore in European affairs; this was the Emperor Charles V, who, in 1525, by his victory at Pavia, forced Francis I to give up his ambitious schemes. Then German and Spanish troops ravaged the peninsula, took Rome by assault, and wrought havoc among its many treasures. Under the domination of Charles V Italy enjoyed a period of comparative peace, though its liberties were curtailed until all its states were practically dependencies of the Holy Roman Empire (which see). The largest measure of freedom was accorded the Papal States, which were at this time the most important part of Italy. And now for more than two centuries Italy had really no history. Its territories were prizes, fought for by the monarchs of Europe, quarreled over by the petty Italian princes. Sometimes armies invaded it and fought on its soil, but there was no Italian army to oppose them; there was no Italian life in the strict sense of the word. Most of the old ducal families which had held sway with such magnificence in the days of the city states were dying out ingloriously, and it seemed as if nowhere in Italy was there any state, any family, which later might serve as a nucleus for a united nation.

Almost unnoticed, however, there did exist such a family, the House of Savoy, the very



AT HEIGHT OF NAPOLEON'S POWER
(1) French Empire
(2) Switzerland
(3) Bavaria
(4) Kingdom of Italy
(5) Kingdom of Naples
(6) Kingdom of Sicily
(7) Kingdom of Sardinia

DIVIDED BY THE CONGRESS OF VIENNA
(1) France
(2) Savoy (to France, 1860)
(3) Switzerland
(4) Nice (to France, 1860)
(5) Piedmont
(6) Lombardy
(7) Venetia
(8) Duchy of Parma

(9) Duchy of Modena; (10) Grand Duchy of Tuscany; (11) Papal States; (12) Kingdom of the Two Sicilies; (13) Corsica; (14) Sardinia.

oldest reigning house in Europe, which held first Piedmont, and later, after the War of the Spanish Succession, received Sicily as well. Still later, Sicily was taken away from the Savoy possessions, and Sardinia was given in exchange, and it was the growth of a real Italy around this apparently unpromising center which developed one of the romances of nineteenth-century history.

The French Revolution. Italy still lay torpid, however, submitting with scarce a protest to Bourbon and Hapsburg rule. But during the latter part of the eighteenth century the awakening was beginning, for the same forces which resulted in the great revolution in France made Italy restless, too. When the French Revolution actually broke out, Italy attempted to join in the coalition against France, and as a result Napoleon invaded the peninsula and in a spirited campaign crushed all resistance and made of Italy a French dependency. The Treaty of Campo Formio in 1797 gave Venice to Austria—a cession of long-lasting importance; and from the rest of Italy created five republics, with Milan, Genoa, Rome, Bologna and Naples as capitals. When Napoleon withdrew, the Italians rose in arms and drove out the French, but by a single battle in 1800 Napoleon reasserted his sway, and later, when he made himself emperor, he rearranged the provinces as suited him, making of Naples a kingdom for his brother Joseph. Even Rome was taken over by Napoleon, while the Pope removed to France. Although lasting only until 1814, Napoleon's distribution of the territories of Italy had a lasting effect, for by blotting out old boundary lines it made the people forget their old provincial divisions and awakened them to the fact that they were all Italians. Indeed, the desire for independence and nationality really was born during this period.

Early Stages of the Struggle. In 1815 came the Congress of Vienna, and its rulings left Italy just about where it had been before—largely in the hands of Austria and the Papacy. The House of Savoy, which had been driven out during the revolutionary times, received again its kingdom of Sardinia, the kingdom of the Two Sicilies went again to the Bourbon Ferdinand, and the Pope recovered all the states of the Church; but elsewhere Austria was all-powerful. All the growing wishes for

unity and independence were crushed, as a result of the reactionary policy of Austria, and the various rulers proved themselves more tyrannical than ever before. Indeed, Austria instituted, politically speaking, a reign of terror, which had as its object the rooting out of liberalism. However, the desire had grown too strong to be suppressed. On every hand secret societies came into being—societies with the most revolutionary purposes; and conspiracies against the foreign rule were rife in every part of the peninsula.

In 1831 there came to the throne of Sardinia a new king, Charles Albert, who proved more liberal than his predecessor, and his concessions caused the other states to look toward him as the possible head of a new, united Italy. The dominant spirit of the times was Mazzini (which see), head of the organization known as Young Italy, and his splendid eloquence roused the Italians to a half-maddened attitude of revolt. Then, in 1848 occurred a revolution in France, and at the same time a revolutionary wave swept over all of Western Europe. Italy felt it keenly, and all over the country insurrections took place. In Naples, in Rome and in Venice the rulers were forced to grant constitutional rights, and the Milanese actually drove the Austrians from their city. The Sicilians threw off the Bourbon yoke, and Charles Albert of Sardinia went the length of declaring war on Austria. But the Austrians defeated him decisively at Novara in 1849, and at once the reactionary forces throughout the peninsula took heart and regained their supremacy. In Sardinia, however, the liberal spirit continued in the ascendancy, Victor Emmanuel II, who came to the throne on his father's abdication in 1849, upholding the policy of Italian freedom and rejecting all overtures from Austria (see VICTOR EMMANUEL II; SARDINIA). Not the least of his services to Italy was the choice of Cavour (which see) as Prime Minister. In any list of the creators of modern Italy Cavour should, perhaps, be mentioned first, for without his farsightedness, his unselfishness and his broad views the achievement would not have been possible.

The Unification of Italy. Cavour's great ambition was to secure the aid of France in throwing off the yoke of Austria, and in this endeavor he was at last successful. Early in 1859 the French forces crossed the Alps and the final struggle for a free Italy began. The great victories of Magenta and Solferino compelled Austria to give up Milan and Northern Lombardy, and then Cavour found to his chagrin that Napoleon III was prepared to go no further. He concluded with Austria the Peace of Villafranca, without even asking the assent of his Sardinian allies, violating his pledge that he would "free Italy from the Alps to the Adriatic." However, the tide had set in the direction of unity, and could not be turned back. Tuscany, Modena, Parma and Romagna declared for annexation to Sardinia; the rejoicing at this triumph was tempered by grief at the surrender of Nice and Savoy, the original home of the House of Savoy, to France as indemnity for its share in the war.

Then occurred that famous expedition under the most adored of all Italian heroes, Garibaldi (which see). It resulted in the conquest of Sicily and Naples, and in November, 1860, the kingdom of the Two Sicilies was annexed to the domain of Victor Emmanuel, who in the next year was proclaimed king of Italy. Venice and Rome were the only parts of the peninsula still to be gained, and the first of these came to Italy as reward for its aid to Prussia in the Seven Weeks' War with Austria. Yet to be a really united kingdom Italy must have its ancient capital of Rome, and in 1867 Garibaldi with his volunteers made an attempt to seize it, but was prevented by the French. Three years later, however, when the French troops were withdrawn from Rome because they were needed in the war against Prussia, Victor Emmanuel entered the city and made it the capital of his dominions.

The Modern Kingdom. After the unification, Victor Emmanuel addressed himself to the task of preserving peace and organizing the new state, and that work was carried on by his successor, Humbert, who came to the throne in 1878. The much-loved Humbert was assassinated in 1900, and his son, the present king, came to the throne as Victor Emmanuel III. He proved himself a wise ruler, able to cope with the distressing political and economic problems which had grown out of Italy's centuries of political extinction. Attempts to establish a colonial policy and to give Italy a place among the great powers of Europe, however, entailed a heavy burden of taxation on the country.

On December 28, 1908, there took place an appalling disaster. An earthquake shook all of Southern Italy and a part of Sicily, destroying Messina, Reggio and a number of smaller towns and resulting in the death of more than 150,000 people. Southern and Eastern Italy

OUTLINE AND QUESTIONS ON ITALY

Outline

I. Location and Size

(1) Latitude
(2) Longitude
(3) Importance of peninsular position
(4) Area

II. Physical Features

(1) Coastal peculiarities
(2) Relief
  (a) Mountain groups
  (b) Coastal and Lombardy plains
(3) Rivers
(4) Climate
  (a) Effects of sea and mountains

III. The People

(1) Racial qualities
(2) Population
(3) Living conditions
(4) Education
(5) Religion

IV. Industries and Commerce

(1) The chief industry—agriculture
  (a) Where practiced
  (b) Chief crops
(2) Manufacturing
  (a) Recent growth
  (b) Chief products
(3) Mining
  (a) Sulphur
  (b) Other products
(4) Transportation
  (a) Railways
(5) Imports and exports

V. Government and History

(1) Government
(2) Colonies
(3) History
  (a) Early history that of Rome
  (b) The troubled medieval period
  (c) Invasion by foreign powers
  (d) The Napoleonic era
  (e) The struggle for unification
  (f) Formation of the united kingdom
  (g) Comparatively recent events
  (h) War with Turkey
  (i) Italy and the War of the Nations

Questions

How has the geographic position of Italy favored its development?

What great ruler regards himself as a prisoner in his palace, and why?

What were the city states? Name several of the most famous and tell when they were at the height of their glory.

How did a great poet express his undying love for Italy?

What Italian educator has become famous the world over, and why?

What North American region is in the same latitude as Italy?

What is the "backbone" of Italy? What is its "football"?

Why does "Look well to the mother before wedding the daughter" have special force in Italy?

Why, with a comparatively heavy rainfall, does Italy need to resort to irrigation almost everywhere?

When and why did a breaking up of boundary lines and a redistribution of territory work toward unification?

Why are farmers so poor in this land of favorable climate and productive soil?

Give several reasons why Italians have emigrated in large numbers.

Why has not Rome always been the capital of united Italy?

What king, what soldier and what statesman had most to do with the unification of Italy?

What famous poem has as its background one of Italy's chief manufacturing industries?

also suffered severely for several years from a cholera epidemic.

In 1911 the peace policy of Italy was set aside, and war was declared on Turkey, the reason given being the desire to protect Italians in Tripoli. As a result of the brief conflict Italy added Tripoli to its group of colonies, but allowed Turkey to keep a representative there as a concession to the Mohammedans. Despite the Triple Alliance, which existed from 1882 and was several times renewed, Italy felt none too kindly toward Austria, while on the other hand its relations with France have grown more and more friendly. Doubtless this fact had much to do with the attitude of Italy when the great European war broke out in 1914. For a year it kept out of the struggle, though showing a decided leaning toward the allies, but on August 21, 1915, it declared war on Turkey, thus identifying itself with the forces arrayed against Germany and Austria. In the latter part of the same year it still further involved itself in the struggle by a declaration of war on Austria, and the armies of Italy and Austria became engaged in a vigorous campaign in the Alps. Through this Italy hoped to regain its lost northern provinces. Only the end of the gigantic conflict, still raging when this volume was printed, can determine the fate of the powers involved and the settlement of the multitude of questions the peace conferences will be forced to confront. A.MC C.

Other Items of Interest. So strongly marked are the dialect peculiarities of Italy that the people of neighboring towns frequently cannot understand each other. Travelers tell of walking in two minutes from one town to another and finding in the second a dialect unintelligible to the inhabitants of the first.

Not many other countries of Europe have as few forms of animal life as has Italy. Even birds are scarcely to be seen, except at the migration season, for practically every living thing that is edible is killed for food.

Italy sends to the United States each year about 25,000,000 pounds of cheese—about one-fourth of a pound for every inhabitant.

Italian peasants who have returned to their country after living for a time in Canada and the United States differ from those who have never left their native land by reason of their greater enterprise and resourcefulness. Their standards of living are higher, and they show little desire to return to the old care-free relation to life.

During the War of the Nations the government of Italy decreed compulsory cultivation of the soil. By this ruling all landowners were compelled to use all their land for crops or for pasture, and to report results to the officials of their districts.

Only China and Japan among the countries of the world have larger silk production.

Consult Kirkland's *Short History of Italy;* Villari's *Italian Life in Town and Country;* Finnemore's *Italy.*

Related Subjects. The following articles in these volumes contain much information on the subject of Italy:

CITIES

Ancona	Padua
Bari	Palermo
Bologna	Parma
Cagliari	Pavia
Catania	Pisa
Florence	Pompeii
Genoa	Rome
Herculaneum	Syracuse
Leghorn	Taranto
Lucca	Turin
Messina	Venice
Milan	Verona
Modena	Vicenza
Naples	

DIVISIONS

Etruria	Piedmont
Latium	Sardinia, Kingdom of
Lombardy	Sicilies, Kingdom of the Two
Monaco	Tuscany
Papal States	

ISLANDS

See list, under article ISLAND.

LEADING PRODUCTS

Grape	Silk
Marble	Sulphur
Olive	Wine

MOUNTAINS

Alban Mountains	Matterhorn
Alps	Mont Blanc
Apennines	Vesuvius
Etna	

WATERS

Adige	Po
Arno	Rubicon
Como (lake)	Tiber

ITCH. The word *itch* is so descriptive as to need no definition. Specialists hold that itching comes from pressure on the end nerves of the skin, and results when the end nerves are caught between thick layers of skin on the outside and dilated skin capillaries on the other. It may be due to a mere nervous influence and have no significance whatsoever, and it may come from general systemic disease, as liver or kidney trouble. The use of certain narcotic drugs, as morphine, causes intense and

persistent itching of the nose, probably of reflex nervous origin. It may be purely mental in origin, as the itching sensation perhaps produced by reading this article. Itching may also be caused by fungous growths or actual minute insects, and in such cases it is a symptom of certain forms of *itch*.

Various Itch Diseases. *Barber's itch,* or ringworm of the beard, is caused by a fungous growth in the skin and hair follicles; *baker's itch* is caused by yeast and dough; *bath itch,* by bathing; *bricklayer's itch,* by the action of lime; *coolie itch* is a tropical disease; *dhobie itch,* or ringworm of the armpit and crotch, is common in the Philippines; *grocer's itch* is said to be caused by the sugar mite; *Malabar itch* occurs on the Malabar coast and is due to a fungous growth; *Norway itch* is produced by a parasite on the wolf; *prairie itch* is due to the itch mite; *straw itch* is caused by an insect and affects those who work in or sleep on straw; and, finally, there is *washerwoman's itch,* which is an eczema from soap irritation.

Home remedies are not likely to prove effective, unless the exact nature of the trouble is known. It is best always to consult a physician. W.A.E.

ITHACA, *ith'a ka,* one of the smallest of the Ionian Islands, lying west of Greece, between the mainland and the island of Cephalonia (see IONIAN ISLANDS). It covers an area of about thirty-seven square miles, and is divided into two nearly equal parts, connected by a narrow isthmus. Its surface is mountainous, and the coast steep and rocky. Wine, currants and olive oil are produced by the natives; sponges and coral are important fishery products. In legend Ithaca is celebrated as the principality and home of Ulysses, the chief character of Homer's *Odyssey.* About 1869 Schliemann, a German archaeologist, made important excavations and identified several sites mentioned by Homer. Vathi is the capital and chief port of the island. Population, 11,000.

ITHACA, N. Y., the county seat of Tompkins County, is the home of one of the largest educational institutions in the United States —Cornell University, a non-sectarian school attended by nearly 6,000 students (see CORNELL UNIVERSITY). The city is situated in the southwestern part of the state, at the extreme southern end of Lake Cayuga, a narrow body of water forty miles in length and part of an inland waterway connecting with the Erie Canal. Ithaca is the southern terminus of the New York State Barge Canal (which see), and is thirty-seven miles south of Auburn and fifty-six miles northwest of Binghamton. The city is served by the Delaware, Lackawanna & Western and the Lehigh Valley railroads, and by electric interurban lines. Its area is nearly five square miles. The population, which in 1910 was 14,802, was 16,750 in 1915, according to the state census.

The city is picturesquely situated; east and west are thickly-wooded hills through which deep gorges are cut by streams, Six Mile, Cascadilla and Fall creeks being the largest; these have waterfalls and cascades of exceptional beauty. Buttermilk Falls and ravine, Lick Brook Falls and glen, Enfield Falls and glen, Washington, De Witt and Renwick parks, and a number of suspension bridges are of special interest.

Cornell University campus and the finest residences are situated on East Hill, about 400 feet above the lake and city. The Federal building, erected at a cost of $200,000, the United States Weather Bureau Station, Ithaca City Hospital, the Ezra Cornell Free Library and the Ithaca Conservatory of Music are the principal downtown buildings.

The industries of the city include the production of salt, which is obtained from driven wells; the manufacture of chains for transmission of power; guns, calendar clocks, wall paper, gasoline engines, boats, aeroplanes, bricks and cement. Ithaca was settled about 1789, and was given its present name by Simeon De Witt in 1806. It was incorporated as a village in 1821 and chartered as a city in 1888. Before Ithaca was founded the principal village of the Catawba Indians stood near Buttermilk Falls; this settlement was made in 1753, and in 1779 it was destroyed by a force commanded by General Sullivan. M.W.

ITO, *ee'toh,* HIROBUMI, Marquis (1840-1909), a modern Japanese statesman, often called "The Father of the Constitution," who saw danger threatening his country if it did not adopt the world civilization. He did all in his power as Prime Minister to introduce radical reforms, and in great degree succeeded. In 1871 he visited the United States, where he studied the coinage system, with the result that he had a new system established in Japan, with a mint at Osaka. After studying the constitutions of various countries in Europe, he reconstructed many of the laws and codes in his own country, and in 1888, when a conservative party gained control, he was chosen to

construct the constitution which forms the basis for the present government. He directed Japan's foreign affairs during the war with China in 1894, and soon after the outbreak of the Russo-Japanese War went to Korea as special adviser to the emperor, where he later was stationed as resident-general, and as such was practical ruler of the country, which later became a Japanese province. In 1901, during another visit to the United States, the degree of LL.D. was conferred upon him by Yale University. During the discharge of his duties he was assassinated by a Korean at Harbin.

ITURBIDE, *ee toor be' tha,* AGUSTIN DE (1783-1824), a Mexican revolutionist who afterwards became emperor. He was noted as the originator of the "Plan of Iguala" by which he proposed to establish the independence of Mexico under a Spanish Bourbon prince. He was born at Valladolid, Spain, but early in life went to Mexico, then a Spanish province. In 1810 he served as lieutenant in a local regiment, but in 1820, on the breaking out of an insurrection, he joined the royalist forces in which cause he displayed such valor and ability that he was promoted to the command of the northern army. The "Plan of Iguala" aroused much opposition, which Iturbide quickly overcame, with the result that in 1822 he was proclaimed emperor of Mexico under the name of Agustin I. The Mexican Congress declared the throne hereditary in his family, and voted him a yearly allowance of $1,500,000. In less than a year, however, the country was torn by civil strife and insurrection, and in 1823 Iturbide was forced to abdicate. He was allowed to retire to Europe with a generous pension, on condition that he should not return. A year later he attempted to enter Mexico, hoping to recover his crown, but was arrested and shot. See MEXICO, subtitle *History.*

IVAN, *ee vahn',* the Russian word for *John,* is the name of several rulers distinguished in the history of Russia, the most noted being the Grand Dukes Ivan III and Ivan IV, who laid the foundations of the empire, which existed until 1917.

Ivan III, the Great (1440-1505), was the real founder of the Russian empire. His reign saw the beginning of expansion and of important diplomatic relations with Western Europe, resulting in a strengthening of the idea of national unity. He conquered Novgorod in 1477, increased the power of Moscow, assumed the title of emperor, and after his marriage to Sophia, niece of the Byzantine emperor, added the double eagle to the Russian coat of arms.

Ivan IV, the Terrible (1530-1584), the first ruler to assume the title of czar, was crowned in 1547. His reign was a continual struggle with the privileged members of the aristocracy, who had controlled the government during his youth. Under the guidance of his "chosen council" and the *Sobor,* or National Assembly, a new code of laws was formed which radically reformed and improved local self-government and administration. He invited learned men and artists to Russia, established commercial relations with England, and toward the end of his reign conquered Siberia. Nevertheless, the name *Terrible* was well earned, for in war and dealing with insurrections, he was extremely cruel.

IVORY, *i' vo ri,* the substance of which the tusks of elephants is composed. Ivory is characterized by a beautiful white color, delicate translucency, perfect elasticity, hardness of texture and capability of receiving a high polish. Moreover, it is a substance which can be readily used for the most delicate work which the carver's or sculptor's art can produce.

Sources of Supply. The best ivory comes from equatorial Africa. The tusks of a male elephant are larger than those of the female; they vary in length from about eight feet upward and weigh from about fifty to 150 pounds each; but sometimes specimens are found which greatly exceed these dimensions. The tusks of the Indian elephant are much smaller. Great quantities of ivory come from Siberia. These are the fossil remains of the tusks of the mammoth and the mastodon, great animals that existed in prehistoric times (see MAMMOTH; MASTODON). The tusks of these animals have been hidden and preserved in the frozen ground for thousands of years, and are now being extracted in some such way as coal is taken from a coal mine. This is known as dead ivory, and it is not of such good quality as the ivory of present-day elephants; however, some of these buried tusks are remarkably well preserved. The chief markets for the sale of ivory are London, Antwerp and Liverpool.

Its Uses. To-day ivory is used in the manufacture of a great number of articles, and it has in consequence a high commercial value. Billiard balls, piano keys, knife and cutlery handles, combs, toilet articles and ornamental articles of various kinds are among the objects made from ivory. The highest quality of ivory

is used in the manufacture of billiard balls. Nothing is wasted of this valuable material, and every particle that remains after the tusk has passed through various processes of manufacture, such as the shavings, dust, etc., is saved. This is converted, by burning, into a black powder called ivory black or into artists' pigments.

In commerce the tusks, horns and teeth of the hippopotamus, walrus and narwhal are sold as ivory. Celluloid and vegetable ivory (see IVORY PALM) are also used as substitutes, but no other substances take the beautiful polish of ivory.

Ivory Carving. There are in the Old Testament many references to the beauty and value of ivory. It is interesting to note that the earliest specimens of human art are carvings of ivory. Thus, remarkably beautiful carvings on bones and ivory were found among the objects discovered in the prehistoric caves of Dordogne, in the south of France. Similar objects have been discovered among the remains left by the ancient lake dwellers in Switzerland. These are the earliest dwellings which prehistoric men built for themselves, so far as we know. The men who produced these works lived in an age when the mammoth and the reindeer were still roving over Southern Europe. In the tombs of ancient Egypt many exquisitely-fine ivory carvings, such as boxes, trinkets, statuettes and the like, have been found. Among the objects brought to light in the excavations of the ancient cities of Assyria and Babylonia were many works in ivory. Specimens of these various objects can be seen in the great museums of the world.

Ivory as a Material in Fine Arts. Ivory was an important material used by the sculptors of Greece. The body of many Greek sculptures was made of wood; the face, hands and other exposed portions of the statue were covered with thin layers of ivory, while the drapery, as well as the hair, was worked in gold. The gigantic statue of Jupiter in Athens and the statue of the goddess Pallas in the Parthenon at Athens, were celebrated examples of such sculptures. These statues were the masterpieces of Phidias.

During the Middle Ages, and especially during the Renaissance, the art of ivory carving had attained high perfection, and many exquisite works from these periods have been conserved. Since the second part of the nineteenth century many famous sculptors have produced works in ivory.

India has always been and still remains the classic home of the art of ivory carvings, while both the Chinese and Japanese are renowned for their fine ivory work, executed with great skill, patience and care. O.B.

IVORY, VEGETABLE. See IVORY PALM.

IVORY COAST, a colony of French West Africa on the north coast of the Gulf of Guinea, between Liberia and the British Gold Coast Colony. It has a coast line of 380 miles, and its area is 125,000 square miles. The French asserted their right to the district about 1843, but the colony was not organized until 1893. The principal centers of trade and population are Grand Bassam, which has a fine harbor, Assinie, Sassandra and Tabou, also on the coast, and the towns of Abidjan and Aboisso, in the interior. Cocoanuts and rubber are collected, and the natives cultivate bananas, pineapples, coffee and maize. The mahogany forests are worked, and gold is found on the Comoe and Bia rivers.

LOCATION MAP
The Ivory Coast is represented by the nearly square black area on the Atlantic Coast.

The colony's ports are visited by the steamers of two French lines, and one British and one German shipping company. Since 1909 there has been railway communication between Abidjan and Dimbokro, and a harbor at Boult has also been constructed. The seat of administration is Bingerville. There are a number of public and Roman Catholic private schools, and telegraph and telephone lines connect the principal towns. The yearly revenue is sufficient for the needs of a growing development. Population, 1912, 1,417,000; of these, Europeans numbered about 1,100.

IVORY PALM, a handsome South American tree whose nuts have become an important article of commerce. They have been used extensively in the manufacture of ivory buttons, as well as chessmen and small ornaments. The tree, properly known as the *tagua palm* among the natives who gather the nuts, grows very slowly to a height of twenty to thirty feet, with large, gorgeous leaves shooting out from the thick central stalk like graceful, green ostrich plumes. Fragrant white blossoms grow at the base of the lowest leaves, where later a large, rough, brown bur appears. Within

the bur sixty to ninety nuts, the size of walnuts, are incased until they ripen, when the lower part of the bur splits open, letting the

IVORY PALM

negritos, as they are often called, fall to the ground. The kernel of the nut, when ripe, is soft, juicy and edible, but after being dried it becomes a very hard, white composition which looks so much like ivory that it is called *vegetable ivory.*

IVY

(*a*) English ivy, valued for window decoration; (*b*) Boston ivy.

The trees, which live to be seventy-five to 100 years old, begin bearing nuts in their sixth year. As the texture of vegetable ivory is such that it readily absorbs dyes and also takes on a high permanent polish, the nuts are shipped in great quantities for making buttons. Over 20,000 tons of them, worth $1,700,000, are shipped from Ecuador alone each year. See BUTTON, for illustration.

IVY, *i'vi,* a hardy, climbing plant, with shining and waxlike leaves that vary in form from three to five lobes. Its perpetual greenness gives it a beautiful appearance; it lives many years, and is known and valued over the greater part of the world. The common, or English, ivy has inconspicuous flowers and is one of the favorite coverings for walls, and presents the characteristics of a clinging vine. Its creepers hold firmly even to quite smooth walls, and it thrives in all locations where no other plant exposed to the wind could grow. In the fall of the year its leaves change to crimson and scarlet when touched by the frost.

Ground Ivy. The ground ivy bears but little resemblance to the common ivy. It is a creeping plant, with a hairy stem, usually tinged with pink. It blooms all summer and is common in waste places and along roadsides. The flowers of this variety of ivy grow in circles close to the stem, and each flower is a purple or blue tube; inside the corolla-tube are four small, yellow-headed stamens. Dickens said of the ivy in his *Pickwick Papers:*

> Oh, a dainty plant is the ivy green,
> That creepeth o'er ruins old!

Poison Ivy, a three-leaved American shrub which, as its name suggests, is poisonous to the touch, affecting some persons more severely than others. Growing in all locations, sometimes near the Virginia creeper, which has five leaves, it is often confused with the latter. An unfailing way to identify the two is to remember that the letter *V* stands for the number five and is also the first letter in the word *Virginia.* The poison ivy's leaves are glossy, dark green; its small flowers, greenish; its berries, white and waxy. The latter furnish food for the birds until late in winter. In the fall the leaves are beautifully colored and very attractive, but beware of gathering them!

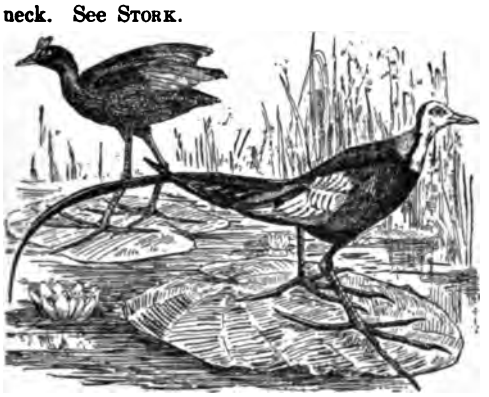
POISON IVY

THE WORLD BOOK
ORGANIZED KNOWLEDGE IN STORY AND PICTURE

Jj

J is the tenth letter in the English alphabet. Like the letter *i* it was derived from the Phoenician *yod,* which it resembles more closely than does *i,* because *yod* was also a consonant. In early English no distinction was made between *i* and *j,* and even after two forms existed for the two letters, there seemed to be no distinction in their usage; but little by little the *j* came to be used exclusively as a consonant. The sound value of *j* is not what it was with the Romans, theirs being rather the sound of the English *y,* which is retained in the word *hallelujah.* Other languages which were derived from the Latin have changed the sound of this letter also, the French and Portuguese giving it a sound which resembles that of English *zh,* and the Spanish making of it an aspirate, like English *h.* Spanish names of places, as San José, San Juan, have made people familiar with this use of the letter *j.*

JABIRU, *jab'i roo,* the only true stork found in North America. It is common in the tropics, and occasionally a jabiru is seen as far north as Texas. It is a very large bird, about four feet long and seven feet across the wings, with a huge bill which is extremely thick at the base, a foot long and curved upward at the tip. Its plumage is pure white, while the bill and legs, as well as the head and neck, which are destitute of feathers, are all black, except for a red ring around the lower part of the neck. See STORK.



THE JACANA
In the background, the Mexican species; in the foreground, the Asiatic.

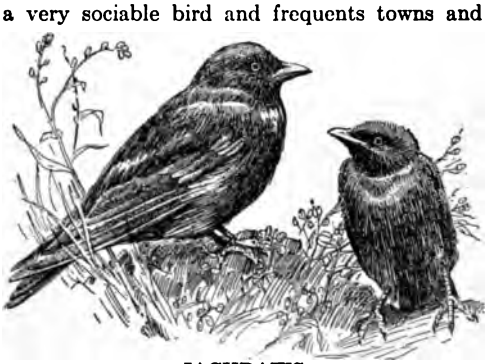
JACANA, *jak'a na,* a small wading bird related to the plovers, remarkable for its long toes and nails, which enable it to run easily over the floating leaves of large aquatic plants in search of food. The various species are distributed over the tropical regions of the globe. An Oriental species, which is called the *surgeon bird,* has a long tail resembling that of a pheasant. It is brownish above and purplish below, and has a white head and wings. Native artists, from India to Japan, delight to paint the jacana. A typical American species, found in the tropics and as far north as Texas, has purplish-chestnut plumage, and is equipped with strong spurs, one in the bend of each wing. In general appearance and habits it resembles the gallinule (which see), or mud hen. See PLOVER.

JACKAL, *jak'awl,* a kind of wild dog inhabiting Asia, Africa and Southeastern Europe. The Arabs call the animal the "howler," because of the dismal cries it utters during the night. In appearance the jackal resembles a fox, with grayish-yellow fur and bushy tail. It is seldom more than fifteen inches high, from shoulder to ground. The animals hunt in packs, usually at night. Because it is not above feeding on carrion, the erroneous notion once prevailed that the jackal helped the lion to track down prey, satisfying itself afterwards with the remnants of the feast. It is timid, and is easily domesticated. The *black-backed*

jackal, an African species, is prized for its fur, which is more highly-colored than that of the common variety.

The jackals' troop, in gather'd cry,
Bay'd from afar complainingly,
With a mix'd and mournful sound,
Like crying babe, and beaten hound.
BYRON: *Siege of Corinth.*

JACK'DAW, a common European bird of the crow species. It is deep black in color, with a grayish fringe around the neck, and is usually about fourteen inches in length. It is a very sociable bird and frequents towns and



JACKDAWS

villages, building its nest in spires and holes in trees. Jackdaws make intelligent pets, but are mischievous, like the crow, and will steal any small, bright object that attracts their attention. One of the best known of the Ingoldsby legends is a story of a jackdaw who stole a cardinal's ring and was cursed until he restored it.

JACK-IN-THE-PULPIT, or **INDIAN TURNIP,** a quaint American wild flower of the moist woodlands and thickets, found growing from Nova Scotia southward to the Gulf states and as far west as Minnesota. It belongs to the arum family and is related to the calla lily. Jack-in-the-Pulpit has been aptly named. The tiny greenish-yellow flowers of this plant are clustered on the lower part of a smooth, slender stalk, called the *spadix,* which is enveloped by a curving, leaflike *spathe* whose broad, overhanging flap is the sounding-board of the "pulpit."

Jack-in-the-Pulpit
Preaches to-day,
Under the green trees
Just over the way.
Green is his surplice,
Green are his bands;
In his queer little pulpit
The little priest stands.

Green fingers playing
Unseen on wind-lyres—
Low singing bird voices—
These are his choirs.
—WHITTIER.

The spathe is pale green in color, more or less striped with purple and brownish lines. This odd-shaped plant may be seen in blossom from April to June; the flowers are followed by clusters of smooth, red berries, which the Indians at one time used to boil for food. The plant grows from a turniplike root filled with a fiery juice, sometimes used in concocting domestic medicine. The root, though tasteless when boiled, was eaten by the Indians.

JACKSON, ANDREW (1767-1845), an American soldier and statesman, President of the United States from 1829 to 1837, the seventh man to hold that office. In an age which produced Clay, Webster, Calhoun and other great men, **Jackson was perhaps the most striking character of his day. He was a lawyer by profession, a fighter by preference, and a poli-**

tician through circumstance. He was violent and quick in temper and loved a fight for its own sake.

He was constantly involved in quarrels, and nearly always was firmly convinced of the correctness of his own opinions. Yet he was not arrogant or egotistical, and could be easily influenced by those who understood him. As a boy he had practically no schooling, and had been allowed to run wild; yet as a man he had dignity and courteous manners, and he could express himself in a vigorous style. He was in many ways typical of the times and of the section he represented. He was a frontiersman and not, like his predecessors in the Presidency, an aristocrat trained to govern. His election was significant because it was visible evidence that a new spirit was working in the United States. Jackson was the first President who belonged to the "common people."

A character as strong as Jackson's was bound to leave a deep impress on American history, and there is good reason for calling his two terms the "reign of Andrew Jackson." He entered office practically without fixed political opinions, yet almost every important event of his administration bears the stamp of his personal influence. With the exception of Van Buren, the members of his Cabinet were little more than a committee to carry out his orders. On the other hand, Jackson often accepted advice from his intimate friends (see KITCHEN CABINET), and some of the measures which are most closely associated with his name were really the work of others. Such, for example, was the introduction of the spoils system (see subhead below), which was chiefly the work of Van Buren. It has been said of Jackson that he was not a great President, but that he was a great party President. With Thomas Jefferson, Jackson is considered the creator of the Democratic party; if Jefferson may be said to have drawn the plan for the structure, Jackson erected it.

His Youth and Early Manhood. Andrew Jackson was born on March 15, 1767. The place of his birth is uncertain, the honor being claimed both by North Carolina and by South Carolina. Jackson himself always believed that he was born near Waxhaw Creek, in Lancaster County, S. C., and most of his biographers agree with him. His father, also named Andrew Jackson, was a poor farm laborer, of Scotch-Irish descent, who with his wife emigrated from Ireland in 1765 and settled on Twelve-Mile Creek, near the border between North and South Carolina. The region was unsurveyed and sparsely settled, and the people of the neighborhood were not sure in which colony they lived. It is now believed, however, that the Jackson cabin was about a quarter of a mile south of the boundary.

Andrew Jackson, the father, died in 1767, only a few days before the birth of a son, who was named for him. The Widow Jackson was a well-meaning mother, but she placed little restraint upon her children. Andrew was the youngest of three sons, but he became the undisputed leader of the boys of the neighborhood. He indulged his enthusiasm for horse racing and cock fighting, and was always, without being malicious about it, ready to fight anybody. His mother died as the result of fever contracted while nursing American soldiers held prisoners by the British during the Revolutionary War, and his two brothers were killed. Andrew himself, though a lad barely in his 'teens, was once taken prisoner by the British. Several times during the war the British raided the western part of the Carolinas, chiefly for the purpose of getting recruits and strengthening the Tories in that region. On one of these raids in 1781 a British officer ordered young Andrew to black his boots. The boy, in a fit of rage, refused, whereupon the officer struck him with his sword, wounding him slightly, and then carried him off a prisoner. These experiences gave the boy a hearty hatred of the English, which he never lost.

The death of his mother and brothers left Andrew alone in the world, and for several years he drifted, supporting himself by such work as he could get. In 1784 he began to study law at Salisbury, N. C., and was admitted to the bar before he was twenty. In 1788 he was appointed public prosecutor for the western district of North Carolina, the region now forming the state of Tennessee. This was a difficult position for a young man of twenty-one, but Jackson's energy and persistence carried him over many rough places. He made some enemies and many friends, and soon was one of the best-known men in the region. He also won a wife, in the person of Mrs. Rachel Robards, the daughter of one of Tennessee's pioneer settlers; the marriage took place in 1791.

In Politics and Business. Jackson was a member of the convention in 1796 which adopted a constitution for Tennessee, and in the same year was elected to the House of Representatives, where he distinguished him-

self by his violent opposition to President Washington. In 1797 he was elected United States Senator, but he resigned in the next year, and was for six years judge of the Tennessee supreme court. For a number of years

ANDREW JACKSON

While not the greatest man of his day, he was a unique, commanding figure, at once one of the most maligned and most honored men in American history.

Jackson conducted a store, managed his plantation, and fought occasional duels, in one of which he killed his opponent. It was about that time, after 1805, that he became intimate with Aaron Burr, but it is evident he did not suspect Burr of treachery.

As a Soldier. The War of 1812 gave Jackson the great opportunity of his life. Up to that time he was only a local figure, and even in Tennessee his prestige was declining. There is a striking similarity in the early careers of Jackson and U. S. Grant. Both were born of parents in modest circumstances, and both won distinction early, Jackson in law, Grant in the army. Then they seemed to squander their time, and it appeared they were about to join the class of middle-aged men who had failed to succeed. Jackson was forty-five when the War of 1812 began; Grant was nearly forty at the outbreak of the War of Secession. War made both men national heroes and brought to them the Presidency of the United States.

Since 1802 Jackson had been major-general of the Tennessee militia, and as soon as he heard of the news of the declaration of war, he offered his services and 2,000 militiamen to the President. On January, 1813, he was ordered to New Orleans, and in March was organizing his troops at Natchez, when he unexpectedly received orders to disband his forces and send the men home. Jackson was furious that no pay, rations or transportation had been provided for the men, 500 miles from home. On his own responsibility he secured transportation for the men in a body, and the United States government was later induced to reimburse him. Later in the year 1813 Jackson commanded a body of Tennessee volunteers in a campaign against the Creek Indians, whom he defeated decisively at Horseshoe Bend in Alabama. This victory brought him again into general public notice, and in 1814 he was commissioned major-general in the regular army. Assigned to command in the South, he asked permission from Washington to attack Pensacola, Fla., then Spanish territory but used by the British as a base of operations. When an answer failed to arrive promptly, Jackson took the responsibility on himself and captured the town. The victory was important because it left him free to supervise the defense of New Orleans.

Battle of New Orleans. On December 1, 1814, when Jackson arrived at New Orleans, the city was without defenses. In a frenzy of energy he inspired his army with his own enthusiasm. Breastworks were soon constructed, trenches dug, and all preparations made against attack. Jackson proclaimed martial law and ruled the community with an iron hand. He quelled a threatening mutiny and approved the execution of six mutineers. He also arrested a judge who attempted to resist the enforcement of martial law. When civil law was reëstablished the court retaliated by fining Jackson $1,000, but thirty years later Congress refunded the amount with interest, a total of $2,700.

Jackson's unparalleled energy, however, bore fruit. After several minor attacks in December, 1814, the British made a grand assault on January 8, 1815. They were defeated with heavy loss, and Jackson, the victor, became a national hero. The Battle of New Orleans was the only notable victory won on land by the Americans during the war, and it was fought, strange to say, two weeks after the treaty of peace was signed. In those days of slow communication neither army knew until weeks later that the war was over. See WAR OF 1812.

Indian Campaigns, and Governor of Florida. After receiving the thanks of Congress for his services, Jackson was appointed commander-in-chief of the Southern division of the United States army. Occasional Indian raids had given great trouble, and in 1818 Jackson led an army against the Seminoles, whom he defeated and pursued into Spanish Florida. His seizure of Pensacola and his arbitrary execution of two British subjects, who were accused of stirring up the Indians, caused great excitement both in the United States and in England. Efforts were made in Congress to secure a vote of censure against him, and much angry correspondence passed between the British Foreign Office and John Quincy Adams, then Secretary of State. Jackson's arbitrary conduct in these cases was later held against him by his political opponents, but for the time being the controversy was closed by the cession of Florida to the United States, in 1819. Jackson was appointed military governor of the new territory, but held the office for less than a year—long enough, however, to have one sharp conflict with the civil authorities.

Politics and the Presidency. Jackson's military career was now at an end. It had made him one of the most conspicuous men in the United States, and a hero on the frontier. The Tennessee legislature, as early as 1822, suggested his nomination for President, and in 1824 formally proposed his name as the Democratic candidate. In the election, which is described in detail in the article on John Quincy Adams, Jackson received more electoral votes than any other candidate, but did not have a majority. Under the Constitution, therefore, the choice was left to the House of Representatives, which elected Adams. Jackson and his followers were enraged at what they called the "corrupt bargain" between Adams and Henry Clay. Clay's influence in the House certainly won the Presidency for Adams, and the latter appointed Clay Secretary of State, but it is now generally admitted that the charge of a "bargain" to this effect was without foundation.

Jackson, however, seems to have been told and to have believed that he was deliberately cheated out of the Presidency, and the more he thought about it the more bitter he became toward Clay and Adams. This personal animosity soon led to a break in the Democratic (or Democratic-Republican) party, the followers of Adams and Clay assuming the name of National Republicans. Jackson was elected

United States Senator from Tennessee in 1823, but resigned in 1825 and thereafter threw all his energies into opposition to the Adams administration. Almost from the day of Adams' inauguration, Jackson kept in view the next Presidential election. In 1828 he had his revenge, and was elected President by an electoral vote of 178 to 83 for Adams. Calhoun, who was Vice-President under Adams, was reëlected.

His Administration, 1829-1837. The eight years during which Jackson was President reflect with considerable accuracy the character of the man. The administration, it has been said, was "distinctly one of conflict," and when Jackson was not engaged in some political struggle he was upsetting traditions and conventions of every kind. This does not mean that the acts of the administration, which included the introduction of the spoils system, the Nullification controversy, and the fight against the Bank of the United States, cannot be regarded as constructive.

The Spoils System. One of the first indications of Jackson's policy was the removal of most of the government officials, even to postmasters in small villages and customs inspectors. Jackson's motives were not dishonorable; he believed that the government had become "bureaucratic," and consequently aristocratic, and felt that to substitute his own partisans was merely to make the government democratic. The slogan of the President's partisans was "To the victors belong the spoils." Quite aside from Jackson's honesty of purpose, he made the fatal mistake of appointing to office many persons whose only recommendation was that they were Jackson Democrats.

In the forty years which elapsed between the inauguration of Washington in 1789 and the inauguration of Jackson, only seventy-four government employees had been dismissed, and all of these for good reasons. During the first twelve months of his administration Jackson dismissed over 2,000 employees, with scarcely an exception because they belonged to the political opposition. It is not fair to say that Jackson wilfully corrupted the civil service, but it is quite correct to say that he introduced into the Federal government the system which William L. Marcy and Van Buren had already perfected in the state of New York, a system in which the privilege of appointing officeholders was made one of the chief functions of government. It is true, therefore, that Jackson was the first President to build a political "machine" on the basis of patronage, and he fastened on the United States a system which bred corruption for half a century.

The Tariff and Nullification. In 1828, shortly before the close of John Quincy Adams' administration, Congress passed a law providing a high protective tariff. This law, called the "Tariff of Abominations," was especially disliked in the South, where it was felt that high duties on foreign manufactured goods would lead to discrimination against American cotton and other raw products. The act was resented particularly in South Carolina, but it caused indignation throughout the South and led to the first clear statement of the doctrine of *nullification* (which see). This statement was made in 1830 by Robert Y. Hayne, Senator from South Carolina, in the course of the famous debate with Webster. The Webster-Hayne debate, in which slavery, nullification and the true meaning of the Constitution were discussed with impassioned eloquence, is notable in the Constitutional history of the United States.

Two years later, in 1832, Congress passed another high-tariff law. The South Carolina legislature at once declared this law and the tariff law of 1828 unconstitutional, therefore "null and void," and threatened to secede from the Union if any attempts should be made to collect customs duties in accordance with these acts. Jackson was personally opposed to such high-tariff laws, but he prepared to execute the laws by force. He ordered troops to be concentrated at a convenient distance from Charleston, sent two warships to Charleston harbor, persuaded Congress to pass the Force Bill, and in a stinging proclamation warned the people of South Carolina not to resist the law. Vice-President Calhoun resigned his office, was at once elected to the Senate by the South Carolina legislature, and in fiery speeches defended the state and maintained its right to nullify and to secede. Open hostilities seemed unavoidable, when a compromise tariff was arranged, chiefly through the efforts of Henry Clay, "the great pacificator." Jackson's vigorous actions, however, temporarily halted the excessive states-rights movement. See Force Bills.

The Fight against the Bank. Jackson's opposition to the Bank of the United States was not economic, but political. He was persuaded that the "money power" of the United States, led by the bank, was preparing to crush him, and that he was the champion of the "common people." In his first message to Congress Jack-

OUTLINE AND QUESTIONS ON ANDREW JACKSON

Outline

I. Early Years

(1) Birth and parentage
(2) Youth
  (a) Experiences during Revolutionary War
(3) Study of law
(4) Appointed prosecutor on western frontier

II. Beginnings of Public Life

(1) Tennessee constitutional convention
(2) In the House of Representatives
(3) In the Senate
(4) Judge of Tennessee supreme court
(5) Military career
(6) Governor of Florida
(7) Elections of 1824 and 1828

III. Administration

(1) Governmental affairs
  (a) The "Spoils System"
    1. Dismissal of 2,000 employees
    2. Effects
      a. Corruption
      b. Creation of political "machine"
  (b) The tariff and nullification
    1. The "tariff of abominations"
    2. South Carolina's threat of secession
    3. Webster-Hayne debates
    4. Force Bills
    5. Compromise Tariff
  (c) Financial affairs
    1. The fight against the United States Bank
    2. Surplus in Treasury
    3. The "Specie Circular"
    4. The panic
  (d) Indian affairs
    1. Black Hawk War
    2. Seminole War
(2) Other events
  (a) Arkansas and Michigan admitted
  (b) *The Liberator* founded
  (c) The Texas question
  (d) Death of Madison and Monroe
  (e) Invention of reaping machine
(3) Election of 1836
  (a) Issues
  (b) Candidates
  (c) Results
(4) Lasting influence of Jackson

Questions

What resemblances are there between the life of Jackson and the life of Grant?

How did the number of employees dismissed by Jackson from government offices compare with the number dismissed in all the preceding administrations?

To what two Presidents was Jackson violently opposed?

How has the name of this President become proverbial in politics?

Tell the story of the beginning of Jackson's hatred of the English.

When and how did he believe himself to have been cheated out of a high office?

How was the slavery struggle intensified during this administration?

Why is it impossible to tell in what state Jackson was born?

When did Jackson fail of election, though receiving more electoral votes than any other candidate?

How did the government propose to get rid of the surplus in the Treasury? What were the results of the policy?

When did Jackson almost precipitate a break with England?

When and why were resolutions of censure against him passed by the Senate?

What important battle did he fight with an enemy that was no longer an enemy?

Who was "the great pacificator," and what part did he play in this administration?

When did Jackson attack and capture a town on his own responsibility?

What was the "tariff of abominations" and what part did it play in leading up to the War of Secession?

son had showed his hostility to the Bank, and when Congress, in 1832, rallied to its support and voted to renew its charter for twenty years after 1836, Jackson vetoed the bill. The rechartering of the Bank became the chief issue of the Presidential election of 1832, in which Jackson received 210 electoral votes to 49 for Henry Clay. This overwhelming victory Jackson interpreted as a vindication of his opposition to the Bank. He ordered the Secretary of the Treasury to withdraw the government's deposits from the Bank. The Secretary refused to obey the instructions, was displaced by another who also refused and was also displaced, and it was not until September, 1833, that Jackson found and appointed a man willing as Secretary of the Treasury to obey his orders. The withdrawal of the government's deposits practically ended the Bank's activities. Jackson's high-handed actions in the fight against the Bank led the Senate to pass formal resolutions of censure upon him, a course without precedent. The resolutions were expunged from the Senate records by vote in 1837.

The Surplus and the Specie Circular. The Bank of the United States was not the only evidence of Jackson's financial policy. In July, 1836, he ordered the issue of the famous "Specie Circular," which directed government agents to accept only gold or silver in payment for public lands. This order created great excitement in the West, where much of the currency in circulation was the notes of unstable, or "wild-cat," banks. In the meantime the high tariffs were bringing in more money than the government needed, the national debt was extinguished and a surplus was piling up. Congress, a month before the Specie Circular was issued, provided that any surplus exceeding $5,000,000 should be divided among the states as a loan. The surplus, unfortunately, was in the hands of about eighty prominent banks, who had regarded it almost as a permanent loan, and used it as the basis of an inflated credit. Suddenly called on to return this money, the banks were obliged to call in their loans. The restriction of credit coincided with a financial crisis in Europe, which caused a fall in the price of cotton. All of these circumstances combined to start a panic which broke just as Jackson went out of the office and left the burden to Van Buren.

Other Governmental Affairs. Jackson's vigorous attitude against nullification in South Carolina is in contrast to his refusal to act against Georgia. Soon after Jackson's first inauguration Georgia passed a law ousting the Cherokee Indians from lands which they held by treaty with the United States. The Indians appealed to the President for protection in their rights, but were told that he had "no power to oppose the exercise of sovereignty of any state over all who may be within its limits." This was his decision in 1830, but two years later his position was reversed. In 1832 the Indians in the West gave some trouble (see BLACK HAWK), and in 1835 the Seminoles began a warfare which cost the United States $50,000,000 and several thousand lives.

Foreign relations during Jackson's term were of little importance, but it is interesting to note that he secured from Great Britain the right of direct and unrestricted trade in the British West Indies.

Slavery and Domestic Problems. Two states, Arkansas in 1836 and Michigan in 1837, were admitted to the Union while Jackson was President. The admission of new states was closely related to the great problem of slavery. A new period in the slavery controversy was inaugurated by the founding of *The Liberator* by William Lloyd Garrison in 1831, and henceforth the Abolitionists (which see) gave the defenders of slavery no peace. About this time Texas was beginning its war for independence. It was rightly believed that an independent Texas would soon be annexed to the United States, and its great area could then be divided into several states to preserve the balance between the North and South. The Senate of the United States resolved to recognize Texas as an independent nation, but the House defeated the resolution.

TOMB OF JACKSON
At "The Hermitage."

The death of Monroe in 1831 and of Madison in 1836, the organisation of the Mormon Church in 1830, and the invention of the reaping machine by Cyrus H. McCormick in 1831, are miscellaneous events worthy of notice. At the end of his second term, Jackson

retired to his home, "The Hermitage," near Nashville, Tenn., where he passed away on June 8, 1845, in his seventy-eighth year.

Jackson's Influence. Jackson, with the possible exception of George Washington and Theodore Roosevelt, is perhaps the only President of whom it can be said that he left office more popular than when he entered it. He was the champion of the masses, and more than that, he was typical of his generation. He felt and acted as most men, growing up under new social and economic conditions, would have acted. He was autocratic, but he was also simple and unostentatious. He organized a political party and left it strong and charged with enthusiasm. To this day "Jacksonian democracy" and "Jacksonian simplicity" are terms which politicians still use. W.F.Z.

Consult Hotchkiss's *The Land Hero of 1812;* Sumner's *Andrew Jackson as a Public Man;* Watson's *Life and Times of Andrew Jackson.*

JACKSON, HELEN FISKE HUNT (1831-1885), an American novelist and poet, whose two best-known stories, *A Century of Dishonor* and *Ramona,* are the expression of her bitter indignation over the ill-treatment accorded the Indians by the United States government. When the former was published, in 1881, she gave a copy of it to every member of Congress, and was thereupon appointed special commissioner to investigate Indian affairs. *Ramona,* sometimes called the "Uncle Tom's Cabin of the Indians," was one result of her work. This pathetic story is far from being merely a novel of the purpose type, for its beautiful descriptions, dramatic interest and excellent character drawing give it real literary value.

Its author was born at Amherst, Mass. When she was twenty-one she married Major Edward B. Hunt, who died in 1863. The poems written in the early days of her widowhood were favorably received, and in 1870 she published a volume of verse under the pen name "H. H." Thereafter she wrote almost constantly, and *Ramona,* published the year before her death, was completed while she was struggling hopelessly against a fatal disease. In 1875, while in Colorado Springs in search of health, she married William S. Jackson, and it was there that her sympathies for the Indians were awakened.

Her writings include novels, poetry, essays, travel sketches and tales for children. Aside from her two books mentioned above, her best-known novels are *Mercy Philbrick's Choice* and *Hetty's Strange History.* Such reliable judges as Emerson and Thomas Wentworth Higginson have expressed their admiration for her lyrics, which reveal a genuine poetic gift. Many of these are popular among children, one of the favorites being the poem entitled *October,* which begins:

> O suns and skies and clouds of June
> And flowers of June together,
> Ye cannot rival for one hour
> October's bright blue weather.

Mrs. Jackson was first buried on Cheyenne Mountain, in Colorado, but as the site became a sort of recreation ground for tourists and the people of the neighborhood, her heirs decided to reinter the body, and it now rests in the cemetery at Colorado Springs.

JACKSON, THOMAS JONATHAN (1824-1863), an American general, accounted by many the most efficient of the Confederate officers who fought under Lee during the War of Secession. The deep earnestness and unflinching steadiness which marked both his military and his personal character are reflected in the name by which he is universally and affectionately known, "STONEWALL" JACKSON. When, during the first Battle of Bull Run, Jackson's Virginia Brigade was seen fighting valiantly against what seemed to be overwhelming odds, General Bee called out, "There stands Jackson like a stone wall." So apt a phrase at once captured the imagination of the soldiers, and from that time on Jackson was known as "Stonewall" and his troops as the "Stonewall Brigade."

"STONEWALL" JACKSON

Thomas J. Jackson was born on January 21, 1824, at Clarksburg, Va. (now West Virginia). Left an orphan at an early age, he received only a limited country schooling until he was eighteen, when, mainly through his own efforts, he secured admittance to West Point Military Academy. In 1846 he was graduated with honors, and soon after joined the army that was fighting in Mexico. At Vera Cruz, Contreras and Chapultepec he proved himself one of the most gallant of the American officers, rising in less than a year from the rank of second lieutenant to that of brevet major.

From 1851 until the outbreak of the War of Secession, Jackson held a professorship in the Virginia Military Institute, at Lexington. Though others excelled him as a teacher, his life and character were a lasting influence for good, especially among the negroes. He was deeply and sincerely religious, and his Christian faith was the mainspring of every act of his life. Years after, when a bronze monument was to be erected to his memory in Richmand, the first contribution came from the colored Baptist Church of Lexington, though he had fought valiantly to maintain slavery.

Jackson gave himself whole-heartedly to the cause of the Confederacy, though he would have rejoiced to see the Union preserved. After the Battle of Bull Run he was promoted to the rank of major general, and in a campaign in the Shenandoah Valley against General Banks not only won important victories but completely baffled the Federal commanders, who tried in vain to trap him. In June, 1862, he joined Lee in the defense of Richmond against McClellan, later fought against Pope in the second Battle of Bull Run, and gave brilliant aid to his commander in the battles of Antietam and Fredericksburg. In May, 1863, while reconnoitering after dark, on the evening following the first day of the Battle of Chancellorsville, he was accidentally shot by Confederate outposts. His death more than offset the victory over the Federals, and Lee declared that he had lost his right arm. Jackson was buried, in accordance with his wish, at Lexington, where a statue and memorial hall perpetuate his memory. B.M.W.

Consult White's *Stonewall Jackson;* McGuire and Christian's *The Confederate Cause and Conduct of the War Between the States.*

JACKSON, MICH., an important manufacturing city and distributing point of the state, and the county seat of Jackson County. It is situated on both banks of the Grand River in the southern part of the state, about midway between the eastern and western borders. Lansing is thirty-seven miles north and Detroit is seventy-five miles east and north. The importance of Jackson as a distributing point is due to the transportation facilities offered by the main lines and branches of the Michigan Central, the Cincinnati Northern, the Cleveland, Cincinnati, Chicago & Saint Louis and the Grand Trunk railways. Interurban lines connect with important cities in the state, west, north and east. The population in 1916 was 35,363, by Federal estimate, an increase of 3,930 since 1910. The area is a little less than nine square miles.

The region surrounding Jackson is rich in agricultural products, and there is a large trade in fruits, grain and vegetables, the most distinctive product being beans. The chief manufactures are flour, soap, starch, automobiles and accessories, pianos, corsets, underwear, wheels, engines, locomotives, cigars, Portland cement, iron and steel products and textiles. About 9,000 people are employed in the various industries of the city; besides, the car shops of the Michigan Central Railroad, located here, employ about 1,200. The notable buildings are the Federal building, Michigan State Prison, Masonic Temple, Elks' Temple, courthouse and Carnegie Library. A fine park system covers 650 acres.

The first permanent settlement was made in 1829 by Horace Blackman; it was named Jacksonburgh in 1830 in honor of Andrew Jackson, seventh President of the United States. A post office was established in the same year and called Jacksonapolis, the present name being given the town in 1838. With the construction of the Michigan Central Railroad through the southern part of the state in 1841, the growth of the town began. It became a village in 1843, was incorporated as a city in 1857 and adopted the commission form of government, with four commissioners, in 1915. At a convention held here July 6, 1854, the National Republican party was organized. P.A.L.

JACKSON, MISS., the capital and largest city of the state, an important cotton market, and the county seat of Hinds County. It is on the west bank of the Pearl River, forty-five miles east of Vicksburg and the Mississippi River, and is 183 miles north of New Orleans, La., and 227 miles south of Memphis, Tenn. It is served by the Alabama & Vicksburg, the Illinois Central, the Yazoo & Mississippi Valley, the New Orleans & Great Northern and the Gulf & Ship Island railroads, and by small freight and passenger steamboats. During the decade from 1900 to 1910 the population was almost trebled, increasing from 7,816 to 21,263. In 1916 it was estimated at 29,737 by the Census Bureau; of these about fifty per cent were white and fifty per cent were negroes. The area of the city is ten square miles.

Interesting features of Jackson are Smith, Poindexter and Livingstone parks, the old and the new Capitol buildings, the Federal building and governor's mansion, a statue of Jefferson Davis and a Confederate monument, and

remains of fortifications erected during the War of Secession. The city contains Millsaps College (Methodist Episcopal, South); Bellhaven College (non-sectarian) for girls; Jackson College for negroes (founded at Natchez by the American Baptist Home Mission Society, and removed to Jackson); Campbell College; state schools for the blind, deaf and dumb and the insane; the state library; James Observatory; a Carnegie Library; hospitals and sanitariums.

Jackson is situated in a productive cotton section, and not far distant is the long-leaf pine region. The principal industrial establishments of the city are cotton-oil mills, lumber mills, a casket factory, sash and blind mills and fertilizer factories. The site of Jackson was chosen as the seat of the state government in 1821. The town was founded and named in honor of Andrew Jackson in 1822, and it was chartered as a city in 1840. In 1912 the commission form of government was adopted.

JACKSON, TENN., a cotton market and important trade center of the state, and the county seat of Madison County, is situated on the South Fork of the Forked Deer River, in the western part of the state, about midway between the northern and southern state lines. Memphis is eighty-five miles southwest and Cairo, Ill., is 120 miles northwest. The Illinois Central, the Mobile & Ohio, the Nashville, Chattanooga & Saint Louis and the Birmingham and North Western railways provide fine transportation facilities. The population was 17,807 in 1916, according to a Federal estimate; in 1910 it was 15,779.

Jackson is the trade center for a large productive agricultural section, extensive shipments being made of strawberries, tomatoes, cotton and grain. From the city radiates a network of Madison County's famous gravel roads. The principal manufactures include engines, boilers, cotton goods, lumber, machinery, flour, cottonseed oil, furniture, trunks, spokes, plows, carriages and bricks. Among the notable buildings are the $75,000 Federal building, the $75,000 Y. M. C. A. building, Elks' Home and a $340,000 Carnegie Library. Jackson is the seat of Union University (Baptist), Memphis Conference Female Institute, and Lane College, for negroes.

The first settlement was made in 1816, the town was incorporated in 1823 and the city charter was granted in 1854. In 1907 a new charter was granted by which the sale of intoxicating liquors was permanently prohibited. In 1915 the commission form of government, with three elective officers, was adopted. It was named for Andrew Jackson, seventh President of the United States. R.S.F.

JACK'SONVILLE, FLA., the county seat of Duval County, the largest and most important commercial city of Florida, a port of entry and well-known winter resort. It is in the northeastern corner of the state and is situated on the west bank of the Saint John's River, fourteen miles directly, and twenty-seven miles by water, west of the Atlantic Ocean. Saint Augustine is about forty miles southeast and Savannah is 146 miles north and east.

Jacksonville is known as the *Gate City of Florida.* It is the largest railroad center of the state, and is on the Atlantic Coast Line, the Seaboard Air Line, the Southern, the Georgia Southern & Florida and the Florida East Coast railroads. The work of the Federal government in deepening the channel of the river has made the city the port of several steamship lines. Its area is nearly ten square miles. In 1910 the population was 57,699; in 1916 it was 76,101, by a Census Bureau estimate.

Jacksonville is an attractive city, with streets and private residence grounds made beautiful by tropical and semitropical vegetation. In the city are Confederate, Springfield, Riverside and Hemming (containing a Federal monument) and other parks, and about eighteen miles distant are the beaches. Orange groves add much to the beauty of the surrounding country.

Among many noteworthy buildings, nearly all of them recently constructed, are the Federal building, city hall, county courthouse, armory, Union Depot, Y. M. C. A., Masonic Temple, and a Carnegie Library. There are a number of fine hotels, a United States Marine Hospital, Saint Luke's, Saint Catherine's and the county hospitals, and the De Soto and several private sanitariums. Jacksonville has a Confederate soldiers' home and Daniel Memorial and Saint Mary's orphanages. The Florida Baptist Academy and Cookman Institute (Methodist Episcopal), schools for colored people, and a military academy are located here. Especially interesting sights for visitors are the ostrich and alligator farms. The city has become a very popular outdoor studio for moving-picture companies.

The large export trade of the city includes lumber, naval stores (turpentine and rosin), phosphate, cigars, oranges, moss, cotton, kaolin, fruits and vegetables. The industrial enter-

prises include ship yards, iron foundries, brick yards, steam engineering works, cigar, carriage, ice, mattress and palmetto-fiber factories and lumber and planing mills. Jacksonville is the center of an extensive trade with towns throughout the state and on the coast.

A settlement at Jacksonville in 1816 preceded the town, which was laid out in 1822 and named in honor of General Andrew Jackson, Florida's first territorial governor. In 1833 the place was incorporated as a city. During the War of Secession it was occupied at three different times by Federal troops, and in the Spanish-American War was a coaling station and point of embarkation for troops and supplies. In 1888 it was visited by a severe epidemic of yellow fever; in 1901 a great fire destroyed more than half of the business section and many private dwellings, causing a property loss of $15,000,000.

JACKSONVILLE, ILL., a city of homes and schools, and the county seat of Morgan County, situated in the west-central part of the state, thirty-six miles west and south of Springfield and ninety-five miles north of Saint Louis. It is on the Wabash (the first railroad in the Mississippi Valley), the Chicago, Burlington & Quincy, the Chicago, Peoria & Saint Louis and the Chicago & Alton railroads. The area is nearly six square miles. The population in 1910 was 15,326; in 1916 it was 15,481, by a Census Bureau estimate.

The city is built upon rolling prairie land. Near by are Morgan Lake and Dunkan Park, attractive pleasure resorts, and the Morgan County Fair grounds. In Nichols Park is held an annual festival and Chautauqua. Jacksonville is the home of a number of schools, including Illinois College, a Presbyterian school founded in 1829, the oldest institution of higher education in the state, with which is affiliated the Illinois Conservatory of Music; the Illinois Woman's College (Methodist Episcopal); Routt College (Roman Catholic); Whipple Academy, a preparatory school for Illinois College; and several private schools and business colleges. An open-air school is maintained.

Among the benevolent and charitable institutions are the state hospital for the insane, state schools for the blind and the deaf and dumb, Passavant Memorial Hospital, the Hospital of Our Saviour and several private hospitals. Prominent buildings include a $60,000 Federal building, armory, opera house, Y. M. C. A. building, courthouse, city hall and a Carnegie Library.

The city is a trading center for a large surrounding agricultural section. In the vicinity are rich coal deposits and gas and oil wells. The industrial enterprises include large bridge works, woolen and planing mills, packing houses and cigar factories.

Jacksonville, which was named in honor of Andrew Jackson, was founded as the county seat in 1825. It was incorporated as a town in 1840, chartered as a city in 1867 and rechartered in 1887. Before the War of Secession it was a station of the famous "Underground railroad" and was the home of Stephen A. Douglas. In 1911 the commission form of government was adopted. H.J.R.

JACK'STONES, a game popular among children, played with five small pebbles or pieces of iron made especially for the purpose. There are several different forms of the game, but all of them consist in tossing the pebbles or iron forms into the air and catching them on the back or palm of the hand in various ways agreed upon by the players. In *Ones,* the pebbles are held in the hand; the jack (any one of the five) is then tossed into the air; the remaining four are quickly laid down, and the jack is caught before it can land. Other forms are known by fanciful names, such as *Peas in the Pod, Riding the Elephant* and *Set the Table.*

JACK'STRAWS, a game played with from twenty to 100 small pieces of wood or ivory of uniform size, from four to six inches in length, carved to represent different kinds of tools and implements. After the sticks have been thrown together in a loose heap in the center of a table, each player in turn extracts as many of them as possible, one at a time, without moving any of those left in the heap. The player uses a tiny hook to remove the sticks or straws from the center pile, and whenever he moves more than one straw at a time he loses his turn to the next player. When all the straws are gone from the center, the player who has secured the greatest number wins the game.

JACOB, *ja'kob,* the true ancestor of the Hebrew nation, and the twin brother of Esau, whose birthright he bought for a mess of pottage. When his father Isaac was 137 years old and nearly blind, Jacob, by dressing like his brother, secured the blessing which went with the birthright. Upon discovering the deception Esau was very angry and threatened to kill Jacob, so the latter departed for Haran on the pretext of seeking a wife. He stayed

there for twenty years, married Leah and Rachel, the daughters of his uncle, Laban, for whom he worked, and then started back to Canaan. On the way he was met by an angel with whom he wrestled all night. This event proved to be the crisis in Jacob's life, for from that time on he trusted in God's strength instead of his own. Upon leaving him at daybreak the angel blessed him, saying, "Thy name shall be called no more Jacob, but Israel: for as a prince hast thou power with God and with men" (*Genesis* XXXII, 28). Thus the Jews, who are descended from Jacob, are often called the children of Israel.

After meeting Esau and obtaining his forgiveness, Jacob crossed the Jordan and lived at Mamre thirty-two years before taking his family down into Egypt, where he stayed until his death at the age of 147. In his later life he acknowledged the wickedness of his earlier career and lived up to his new name, Israel, which means *hero of God*. According to his wish his body was taken to the cave of Machpelah to be buried in the tomb of Abraham. See JOSEPH.

JACOBINS, *jak'o binz,* the most famous club in France during the troubled period of the French Revolution. It met in a hall of the former Jacobin convent in Paris, from whence it took its name. It increased rapidly in favor, gained importance upon the removal of the court and national assembly to Paris, and gradually became the ruling power of the Revolution. The Jacobins originated the terrible Commune of Paris, and for a time they were very powerful. During the Reign of Terror they ruled through Robespierre, who was their most influential member, and after his downfall in 1794 they were overthrown. The term *Jacobin* is now often applied to anyone expressing extreme views in politics. See FRENCH REVOLUTION, and other references in that article.

JACOBITES, *jak'o bites,* a sect of Christians, dwelling chiefly in Syria. In common with Copts and Abyssinians, they hold that the human and the divine in Christ were fused into a single nature, in opposition to the orthodox view that each nature was perfect after its kind. The sect took its name from JACOBUS BARADAEUS, its founder, a Syrian who was consecrated Bishop of Edessa about 541. The Patriarch of Antioch is head of the church, and has under him eight metropolitans, or bishops of the principal sees, and three provincial bishops. Second in rank is the metropolitan of Jerusalem, who dwells with his superior at the monastery near Mardin. The fellowship numbers about 80,000.

JACQUARD, *zha kar',* JOSEPH MARIE (1752-1834), a French mechanician known to fame as the inventor of the Jacquard loom, which simplified the art of weaving. The loom was first exhibited in 1801. It was a system of horizontal and perpendicular bars, springs and hooks, which was adjustable to any kind of loom, and relieved the laborer of the irksome task of guiding the work by hand. When Jacquard attempted to put it into general use in Lyons he was seized by a mob and almost lost his life, for the workmen felt that the new invention would decrease the demand for labor. In the end, however, the French government purchased his invention. See WEAVING.

JADE, a mineral highly prized by the Chinese, by whom it is used for making vases and carved ornaments. It is of various shades of green, and is occasionally white. Jade is so very hard and tough that it is difficult to break small pebbles with a hammer. It takes a good polish, but the surface has a greasy appearance. Jade is one of the oldest stones used by man. Specimens of tools made from it have been found in the lake dwellings of an ancient race in Europe, supposedly of the Stone Age (which see), and jade quarries have been worked by the Chinese for more than 2,000 years. When the ancient Mexicans and Peruvians were found by the Spaniards they possessed implements of jade, and similar tools were in use by the natives of New Zealand when they were first discovered. Jade is composed of silica, aluminum and sodium, and its coloring is due to the presence of iron.

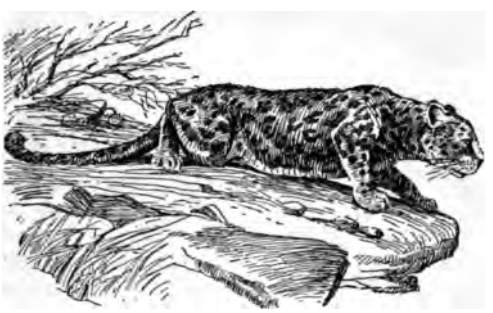
AN ADZ OF JADE
Drawn from specimen in the United States Bureau of Ethnology.

JAFFA, *yah'fah,* or **YAFA,** a Syrian city on the Mediterranean, commercially important as the seaport of Palestine. There is railroad connection with the city of Jerusalem, which lies thirty-five miles southeast, and Jaffa is therefore the chief port of entrance for tour-

ists of the Holy Land. Although the narrow entrance of the harbor is skirted by dangerous reefs and passage is often impossible, trade is important, and quantities of fruits, wool, wine, oils, soaps and sesame are exported. The oranges from Jaffa are reputed the finest in the world. The city, as seen from the sea, is a conical hill of sparkling color, reaching into the cloudless Syrian sky in two minarets and having a bold slope towards the sea. The population is estimated at over 45,000, chiefly Mohammedans. A large German colony has been founded, and there is a Jewish colony of about 8,000.

As ancient Joppa of Phoenicia, Jaffa was the seaport of Jerusalem; through it the timber from Lebanon and other riches of Solomon were imported. It was the port from which Jonah departed for Tarshish, and the city in which Dorcas lived, and here it was revealed to the Apostle Peter that Christianity was for all the world.

JAGUAR, *jag'wahr,* or *ja gwahr',* the largest member of the cat family in the Americas, its native home, and next to the African lion and tiger in size, strength and ferocity. It is found as far south as Northern Patagonia in South



THE JAGUAR

America, and in pioneer days ranged as far north as Arkansas in North America, but its northern limit is now the Medina River in Texas and the Red River in Louisiana.

The average size of the jaguar is six to seven feet from nose to tip of tail. The head is somewhat round in shape, and the legs are large in proportion to the size of the body. The coat, though sometimes almost black, is usually yellowish-brown, marked with spots surrounded with rings of a darker brown, and is a valuable fur. The animal lives principally along densely-wooded streams where food is plentiful, but it is also found on the plains of Paraguay and Argentina. Its habits differ with its living conditions. It springs upon prey from ambush and also attacks in the open, subsisting upon monkeys, deer, tapirs and numerous smaller animals. Some jaguars are good fishers. The jaguar's roar is very loud and terrifying. It rarely preys on man, but is sometimes driven by hunger to attack the unprotected traveler.

JAHN, *yahn,* FRIEDRICH LUDWIG (1778-1852), a German educator, affectionately known as "Father Jahn" among his school children. These he gathered about him on holidays in Berlin to play games until their numbers grew

MONUMENT TO JAHN
A novel memorial stone, erected in Cincinnati, Ohio. It weighs 30,000 pounds, is ten feet high, seven feet wide and three feet thick.

so large that he built an outdoor gymnasium, of which the modern Turnverein is the outgrowth. Born in the village of Lanz, he took a keen interest from childhood in all outdoor sports, so his independent spirit led to many conflicts with his teachers and fellow pupils. After studying five years in Halle and for brief periods at several other universities, he joined the army, but soon resumed his studies, and in 1809 began teaching in Berlin. There he tried to develop harmony and kindle public spirit among his pupils in their games. His efforts resulted in the establishment of gymnasiums not only in Berlin, but in many other cities of Germany. In 1819, as a result of his agitation in favor of German nationality, Jahn was arrested and later forced to live in seclusion

for over twenty years. When William IV ascended the throne he decorated Jahn with the Iron Cross and gave him his liberty, but he died in poverty and obscurity. See TURNVEREIN.

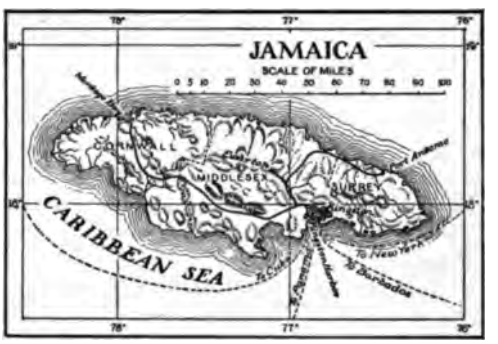
JAIPUR, or JEYPORE, *ji poor'*, the capital city of the native state of Jaipur in India, situated about 148 miles southwest of Delhi; the state of Jaipur is one of twenty-one states in the Rajputana agency ruled by native princes. The city is built of pink stucco, to imitate sandstone, and its streets are wide and are lighted by electricity. It is the only old city in India which is laid out in blocks having right-angled corners. The huge palace of the maharaja stands in the center of the city, and there are three colleges and several hospitals. Jaipur is not unlike other cities in India, where crowds of people are found who differ from each other in color, features, dress, language and customs. Numerous and thriving bazaars, banks and manufactories of muslins, carpets, pottery, brass work and jewelry make the town an important industrial center. Population, 1911, about 137,000.

JALAP, *jal'ap*, a twining plant of the honeysuckle family, with large, purplish-pink flowers and a root resembling the turnip, which varies in size from a hazelnut to a pear. It is found in the mountains of Mexico, about 6,000 feet above sea level, around the town of Jalapa, hence its name. The root contains about ten per cent of jalap resin, and from this is obtained the well-known laxative of the same name, which is usually combined with calomel or bitartrate of potash. Its tendency to cause cramping pains is overcome by adding a little ginger. A compound of powdered jalap, bitartrate of potash and ginger is valued as a remedy in treating some forms of dropsy, but should be administered only by a competent physician.

JALAP

JAMAICA, *ja ma'ka*, "the Queen of the Antilles," the largest and most important of the British West Indies, is an island paradise of tropical vegetation. Its name is derived from the Indian name *Jaymaca*, meaning *the island of springs*. Since the opening of the Panama Canal, which affords a short route to the East, Jamaica's commercial and strategic importance has greatly increased.

This mountainous island, 144 miles long and fifty miles wide, including the smaller Turks and Caicos islands, has an area of 4,424 square miles, about 500 square miles less than the area of the state of Connecticut and twice that



of Prince Edward Island. The island rises from the sea like one of the great turtles which abound in its waters, the central mountain ridges resembling its rough, horny back. From the narrow, golden rim of the sandy lowlands encircling the island the land rises to the purple, cloud-capped peaks of the Blue Mountains, which extend from east to west through its center. The summits range from 2,000 to over 7,000 feet in height, the loftiest being Blue Mountain Peak, rising 7,360 feet above the sea. The uplands and mountain slopes are covered with a luxuriant growth of flowers and forests hung with parasitic mosses, vines and orchids, and inhabited by cuckoos, humming birds, brilliant parrots and butterflies; a place—

"Which all the year is glad with blooms and girt
By groves made green from the bright streamlets wave.
Soft are its slopes and cool its fragrant shades."

Even the stones are cloven by the stems of the creeping wild fig and are clad with a waving veil of flowers and grass.

The coast line is well indented, containing sixteen good harbors, the most important of which are Port Royal or Kingston Harbor, and Old Harbor. Numerous short, swift-flowing rivers flow north and south from the central mountain ridge.

Except in the humid coast lowlands the climate is delightful, and it is one of the principal attractions of the island. The mountains are ideal as both a summer and winter resort, the annual range in temperature scarcely exceeding

fifteen degrees, ranging from 70° to 85° F. at Kingston. The air is of transparent clearness, and the climate is very beneficial for those suffering from lung diseases. There is a wide daily range of temperature, the heat of the day being quickly cooled by the sudden coming of night. The rainy seasons are in May and October, but no month is entirely without rain. Storms arise with amazing suddenness, and the skies are quickly cleared.

The People. According to the census of 1911, the population numbered 831,383. Only two per cent of the people are white, while seventy-seven per cent are negroes and nearly twenty per cent are "colored," that is, half castes. Besides these, there were in the year named 17,380 East Indian coolies and 2,111 Chinese. The East Indians were imported for labor on the plantations after the liberation of the slaves in 1833. The Chinese are the shop-keepers; the "colored" population is largely employed in the trades and professions. The negroes are generally indolent, living upon the abundant fruit of the soil, to be had without effort. The mango is so abundant and provides so large a part of the food of the native population that it discourages industry. The natives do not care to work on the plantations when Nature provides food so lavishly.

The maroons, the descendants of the fugitive slaves, are few, and live apart from the other inhabitants. The inland life of the islands is one of undeveloped simplicity, the natives living in thatch-roofed huts, the women doing most of the family work. In the coast cities the English, Americans and higher classes of the "colored" inhabitants enjoy many modern conveniences. The chief city is Kingston, the capital, with a population of 57,379. Spanish Town, Port Antonio, Montego Bay and Savanna-la-Mar are among other important towns.

Nearly one-half of the population is illiterate. Education is optional, though it is assisted by the government. Besides about 700 elementary schools, there are two secondary schools, three training colleges for women and a training school for men, supported by the government. There are also endowed secondary and industrial schools. There is no established Church. The most popular churches are the Episcopal, Baptist, Methodist, Presbyterian and Roman Catholic.

Industry and Commerce. The soil is of marvelous fertility and agriculture is the chief industry. There are extensive plantations of sugar, tobacco, pineapples and coffee, and groves of banana, cocoa, cocoanut, orange, mango and grapefruit trees. The pimento, or allspice, tree is found almost exclusively in Jamaica, and quantities of ginger and arrowroot are grown. The mountain regions are largely guinea grass fields and pasture lands for live stock. The forests produce much logwood, rosewood, mahogany, ebony, lancewood and lignum-vitae. Turtle fishing is an important industry along the coast. Some iron ores, lead, cobalt and a great variety of marble, porphyrites and granites are found, but they are not worked to any extent. There are many mineral springs of medicinal waters. Sugar mills, distilleries, oil presses and tanneries are the chief industrial establishments.

The trade of the colony is chiefly with the United States, the British Isles and Canada. Bananas and other fruits, sugar, logwood extract, rum, coffee and pimento are the most important exports. Cotton, textiles, fish and flour are imported. Steamship lines operate between Kingston and Cuba, Colon, Barbados and British ports. The chief commercial port is Port Royal, where there is also a British naval station. There is weekly mail service to and from England and cable and mail communications with the United States, and with Halifax, Nova Scotia, *via* Bermuda. In 1914 there were 197 miles of railroad on the island. The electric car speeding along the century-old roads of Kingston, among odd vehicles drawn by donkeys and lean horses, and black women carrying their burdens on their heads, is one of the modern innovations in striking contrast to native customs.

Government. Under the colonial government of England, the island is content and unshaken by political factions. Assisting the governor in the administration of the colony is a Privy Council appointed by the Crown. There is a legislative council consisting of the governor, ten members nominated by the governor, fourteen elected and five ex-officio members. The island is divided into fifteen parishes, governed by elective boards. Justice is administered by high and circuit courts and resident parish magistrates, without trial by jury. The Turks, Caicos and Cayman islands and Morant and Pedro cays are dependencies under the government of Jamaica.

History. Jamaica, originally inhabited by the Arawâk Indians, was discovered by Columbus in 1494. Spanish occupation began in 1509, and before the middle of the seventeenth

century the native population was almost extinct. The island was captured by the English in 1655, and British possession was confirmed by the Treaty of Madrid in 1670. The island was at that time the rendezvous of buccaneers and pirates.

The demand for plantation labor led to the organization of the Royal African Company in 1672, and Jamaica became the greatest slave market in the world. An insurrection of the slaves in 1831 hastened emancipation, and in 1833 all slaves were liberated. This, occurring at the height of Jamaica's prosperity, had a disastrous effect upon the industries of the colony, for the liberated slaves were too indolent to work. In 1866, parliamentary government was abolished and the island was reduced to the grade of a Crown colony. By 1884, representative government was partially reestablished.

On January 14, 1907, the prosperity of the colony was again interrupted by a serious earthquake, in which over 600 lives were lost, and Kingston was almost entirely destroyed. Five years later, the colony suffered another disaster in the form of a cyclone which swept the western part of the island. With rich resources, an ideal climate and plenty of laborers, Jamaica lacks only the spirit of labor to make it the most valuable island possession of Great Britain. E.B.P.

Consult Fiske's *History of the West Indies;* Henderson's *Jamaica.*

JAMES, the name of two kings of England. The accession of the first James marks the beginning of the rule of the House of Stuart in England.

James I (1566-1625), who was the son of Mary Queen of Scots and Lord Darnley, succeeded to the throne of Scotland in 1567, as James VI. In 1603, on the death of Queen Elizabeth, last of the English House of Tudor, he was crowned king of England with the title James I. Scotland and England were thus united under one sovereign, though their political union was deferred until the accession of Queen Anne. James, like the other members of the Stuart family, believed firmly that kings ruled by "divine right." He quarreled frequently with his Parliaments, whose determined opposition to his acts of tyranny had an important influence in preventing the decline of popular liberty in the kingdom.

Early in his reign (1605) a number of Roman Catholics, goaded by unjust persecution, plotted to blow up the Parliament House on the opening day of the first session, but the conspiracy was discovered and its leaders executed. Two years later the first permanent English colony was established in America and named for the soverign. A second permanent colony was founded in Massachusetts in 1620 by a band of Puritans who were driven out of England by the king's threat "to harry out of the land" all who refused to conform to prescribed forms of worship.

Other important events of this reign were the publication in 1611 of the Authorized Version of the English Bible, known as the *King James Version,* which is yet the authorized Scriptures; the colonization of the Irish province of Ulster by Protestant settlers from England and Scotland, the execution of Sir Walter Raleigh, and the impeachment by Parliament of the king's great chancellor, Sir Francis Bacon (1621). In 1589 James had married Princess Anne of Denmark, and the marriage of their daughter Elizabeth to the German elector of the Palatinate resulted, years afterward, in the founding of a new English dynasty.

James II (1633-1701), son of Charles I and of Henrietta Maria of France, succeeded to the throne on the death of his brother Charles II, in 1685. Immediately after his accession he endeavored to carry out two cherished plans: to rule independently of Parliament and to restore the Roman Catholic religion in England. A rebellion headed by the Duke of Monmouth was easily suppressed, but the king's determined efforts to restore Catholicism roused the entire nation against him, and by the "Glorious Revolution of 1688" he was forced to abdicate, the throne being given to William Prince of Orange, and Mary, daughter of James, whose reign is known as that of William and Mary. The dethroned king fled to France, where he was received with cordiality by Louis XIV. Assisted by troops furnished by Louis, James sought to win back his throne by invading Ireland, but in 1690 he was hopelessly defeated by William at the Battle of the Boyne. The rest of his life was spent in retirement in France.

Related Subjects. For a more detailed account of many of the events and personages connected with these reigns the reader is referred to the following articles in these volumes:

Bacon, Francis	Hanover
Bible	Mary II
Boyne, Battle of the	Mary Stuart
Divine Right of Kings	Monmouth, Duke of
Elizabeth	Puritans
Gunpowder Plot	Raleigh, Sir Walter

JAMES, CHARLES CANNIFF (1863-), a Canadian chemist and agriculturist, appointed agricultural commissioner for the Dominion of Canada in 1913. He was born at Napanee, Ont., and was graduated from Victoria College (Cobourg) in 1883. The next three years he spent in special studies, and from 1886 to 1891 he was assistant master of the Cobourg Collegiate Institute. He then became professor of chemistry in the Ontario Agricultural College, and from 1891 to 1912 was also Deputy Minister of Agriculture for Ontario. During this period the work of the department was greatly extended, to a large degree as the result of his efforts.

In 1912 Dr. James was appointed a special commissioner to investigate agricultural conditions and needs throughout the Dominion, and to prepare a plan for coöperation between the provinces and the Dominion government. The result of Dr. James' studies and recommendations was the Agricultural Education Act of 1913, sometimes called the Burrell Act. By this act the Dominion Parliament appropriated $10,000,000, to be spent within ten years, to assist the provinces in carrying on education and demonstrations in agriculture. This amount is divided among the provinces according to population. The administration of this act is Dr. James' work since 1913. Early in 1914 the Dominion government also appointed him a member of a board of enquiry into the high cost of living. The report of this board was issued in 1915.

Dr. James has been an active member of the Board of Regents of Victoria College (now affiliated with University of Toronto), and has written numerous books, among which are a *Text Book in Agriculture; Agricultural Work in Ontario; The Teaching of Agriculture in Public Schools; The First Legislators of Upper Canada, 1792-1796,* and several other studies in Canadian history. G.H.L.

JAMES, EDMUND JANES (1855-), an American educator, economist and university president, was born at Jacksonville, Ill., studied at Northwestern and Harvard universities and at Halle, in Germany. In 1878 he became principal of the high school at Evanston, Ill., in the next year removed to Normal, Ill., to become principal of the Model High School at the state normal, and in 1884 became professor of political and social science in the University of Pennsylvania. There he remained for eleven years, resigning in 1895 to accept a position at the University of Chicago as professor of public administration and director of the extension division. In 1902 he became president of Northwestern University, and two years later president of the University of Illinois.

He has interested himself in many public movements of importance and has served as president of the American Economic Association, the American Academy of Political and Social Science and the Illinois Association for the Prevention of Tuberculosis. His publications include *Relations of the Modern Municipality to the Gas Supply, The Canal and the Railway, The Federal Constitution of Germany, Charters of the City of Chicago* and *Government of a Typical German City—Halle.*

JAMES, HENRY (1843-1916), a writer whose work is distinguished by delicate observation and compelling emphasis. He was born an American, but died a British subject. His first novel, *Watch and Ward,* was promising, but did not show much skill. In 1875 he published *Roderick Hudson,* which ranks favorably with his later novels. His early work contains more humor, swifter action, and greater simplicity than his later productions. After he published several short stories, *The American,* a careful portrayal of a genuine American, appeared in 1877. In 1881 *Washington Square* appeared, with scenes drawn from New York's old aristocratic neighborhood where famous Fifth Avenue begins. Some of his best character portrayals are found in *The Portrait of a Lady,* which is among his most popular novels. Notwithstanding the great length of *The Tragic Muse,* it is one of James' notably successful works. It is a very complicated story, one of his most difficult in structure. His other middle-period novels include *Daisy Miller; A Passionate Pilgrim; The Princess Casamassima; The Sacred Fount; The Awkward Age; The Soft Side; The Better Sort* and *The Bostonians.* His later novels are distinguished by the most artful psychological analysis, and by a peculiarly involved and complex style.

HENRY JAMES
He has been defined as "a kind of supercivilized connoisseur of the emotions."

Although he is best known as a novelist, he also ranks high as an essayist. His essays include *Transatlantic Sketches; Portraits of Places; French Poets and Novelists; The Biography of Hawthorne; Partial Portraits; A Little Tour in France,* and others. Although a native of New York City, Mr. James lived abroad since he was twenty-six years of age; he became a naturalized Englishman in 1915, to show his sympathy for the allies in the War of the Nations.

Mr. James' writings were difficult to understand. He was given to an intricate style in which the reader became lost in the mechanics of the sentence. One author called his novels "marvels of cleverness but splendidly unreadable."

JAMES, SAINT, called *the Greater,* one of the Apostles of Jesus, by whom he was found with his brother John mending nets on the shore of Galilee with their father Zebedee. The two brothers were chosen among the first four Apostles, and their names are always mentioned together in the Bible. Whenever a selection was made from the twelve for any special purpose, the brothers were always of the number. They were among the four present at the raising to life of Jairus' daughter and among the three at the transfiguration and also at the agony in the Garden of Gethsemane. James is the first and only Apostle whose martyrdom is recorded in the New Testament; he was slain by Herod Agrippa in A.D. 44. Christ gave the brothers the name of *Boanerges,* or *sons of thunder,* because they were naturally ambitious and ardent, but after the day of Pentacost their energy was directed towards high and holy things.

JAMES, SAINT, believed to have been the Lord's brother or cousin, and the head of the Church at Jerusalem from its organization. Many facts concerning the "brethren of the Lord" give an outline of his life. As head of the Church and board of elders his life work was naturally to help the Jews in the difficulties which they had to overcome before adopting Christianity. They gave him the name of "the Just" because he was so fair to the Jewish-Christian conscience. After the reference to James in *Acts* XXI, 18, which was in A.D. 58, there is no further mention of him in the Bible, but secular history relates that he was murdered in A.D. 62 during a mob uprising of the Jews.

Epistle of James, the first of the seven epistles in the New Testament addressed to Christians in general. The book, written by Saint James, emphasizes works as the proof of faith; its object was to reform the lately-Christianized Jews and encourage them in the trials to which they were exposed.

JAMES, WILLIAM (1842-1910), the most distinguished of American psychologists and the brother of Henry James, the novelist, was born in New York City. His early education was received under tutors, at home and abroad, but he studied later at the Lawrence Scientific School and in 1869 received the M.D. degree from the Harvard University Medical School. From 1872 to 1907 he taught at Harvard, his subjects being successively anatomy, physiology, philosophy and psychology. In 1899-1901 he was Gifford lecturer on natural religion at the University of Edinburgh, and in 1809 Hibbert lecturer on philosophy at Manchester College, Oxford.

His *Principles of Psychology* appeared in 1890, and at once won him international recognition as a leader of the analytical psychologists. Several of the theories which he advanced, notably that of the "fringe of consciousness," attracted wide attention. The fresh and charming style in which this and his other works were written gave rise to the statement that William James should have been the novelist, while his brother, with his involved analysis of mental processes, should have been the psychologist.

James's work in philosophy was noteworthy also, although he founded no definite system. His *Pragmatism—a New Name for Some Old Ways of Thinking* aroused much opposition, but attracted also zealous advocates. Besides the works mentioned above, James wrote *The Will to Believe; A Briefer Course in Psychology,* which became very widely used as a college textbook; *Human Immortality; The Meaning of Truth* and *Talks on Psychology and Life's Ideals.* A.MC C.

JAMES BAY, the southern extension of the great inland sea known as Hudson Bay, in the northeastern part of Canada. The bay was named in honor of the English navigator, Thomas James, who explored it in 1631 and 1633 in the endeavor to discover the oft-sought Northwest Passage to the Pacific (see NORTHWEST PASSAGE). It is about 300 miles long and 160 miles wide, and contains a number of islands, Agomska, with a length of seventy miles, being the largest. Among the large rivers flowing into the bay are the Moose, Noddawai and Albany. Moose Factory, at the

mouth of the Moose River, is one of the most important trading stations. The Canadian department of Naval Service, in carrying on hydrographic work, has decided that the climate and country around James Bay are favorable to great agricultural development, particularly dairy farming, and the extension of the Timiskaming & Northern Ontario Railway from Cochrane to the shores of the bay will open this region to settlement. For illustration, see HUDSON BAY.

JAMESON, *ja'me son,* LEANDER STARR (1853-), an Englishman, educated as a physician, who became world famous as leader of the raid into the Transvaal which was called "Jameson's Raid," the outcome of the Uitlander disturbance in Johannesburg. He was born in Edinburgh, February 8, 1853, and after studying medicine went to South Africa and established a lucrative practice at Kimberley in 1878. During the troubles between the Uitlander reform party and the Boer government, Jameson, then Cape Premier, concentrated the army of Rhodesia at Mafeking on the Transvaal frontier, by order of Cecil Rhodes, and advanced with 500 troopers to support the Reformers on December 29, 1895, just when they had been intimidated by President Kruger. His army was defeated and Jameson was imprisoned at Pretoria and handed over to the British authorities for trial. He was condemned to fifteen months' imprisonment, but became ill and was released. In 1900 he was elected to the Cape Legislative Assembly for Kimberley, and was Premier of Cape Colony from 1904 to 1908. See SOUTH AFRICAN WAR.

JAMES RIVER, the largest stream in Virginia, flowing wholly within that state, on whose banks, in 1607, Jamestown, the first permanent English colony in America, was settled. The Jackson and Cowpasture rivers unite in the Alleghany Mountains to form the James. Its general direction is southeast for a distance of about 450 miles, and it empties into the Chesapeake Bay through the channel known as Hampton Roads, thence into the Atlantic Ocean. The Chickahominy and Appomattox are its chief tributaries. The Appomattox enters sixty-six miles from the sea and for that distance the James is an estuary or tidal river and navigable by ocean steamers. Small craft ply forty miles farther up stream to Richmond, the capital of Virginia.

JAMESTOWN, the oldest English settlement in America to survive the hardships of pioneer days. In 1607 the London Company (which see) sent an expedition to America under the command of Captain Christopher Newport. Settlement was made about thirty-two miles inland, on the river afterward called James, in order to be reasonably safe from

JAMESTOWN IN 1622

visits of Spanish buccaneers. To Captain John Smith, one of the party, is largely due credit for survival of the company. He kept back the Indians and set tasks for those of the indolent colonists who thought they could live without work. The year 1609, when Smith returned to England because of a wound, was known as starvation year. The few who survived were ready to leave, but upon meeting another expedition they returned.

In 1619 the House of Burgesses, the first representative legislative assembly in the United

RUINS OF OLD JAMESTOWN
As seen from the river.

States, met in Jamestown, which was the capital of Virginia from 1607 to 1698. Also in the year 1619 slaves were brought into Jamestown, marking the introduction of slavery into the

thirteen colonies. The place, after many severe fortunes, was abandoned about 1700. Mary Johnston's novel, *To Have and to Hold,* published in 1899, gives one of the most interesting accounts of the life of the colonists. On the site of the settlement, which is owned by the Association for the Preservation of Virginia Antiquities, may be seen ruins of a church, the fort and a few dwellings. See VIRGINIA, subhead, *History;* SMITH, JOHN.

In 1907 there was held at Hampton Roads a Jamestown Tercentennial Exposition to commemorate this early settlement. Architecturally it was most attractive, the exhibits were interesting, and the attendance averaged over 4,000 daily; but financially it was not a success, and the deficit at the close was over $2,500,000.

Consult *Cradle of the Republic: Jamestown and James River;* Yonge's *Site of Old "James Towne," 1607-1698.*

JAMESTOWN, N. Y., a summer resort and manufacturing city of Chautauqua County, is situated on Chadakoin River, the navigable outlet of the famed Chautauqua Lake, two miles distant. It is in the extreme southwestern part of the state, twenty-five miles east of Lake Erie and sixty-nine miles south and west of Buffalo, and is served by the Erie and the Jamestown, Westfield & Northwestern railroads and by electric and steamboat lines to other resorts on the lake. The population, which in 1910 was 31,297, was reported by the state census of 1915 as 37,780, of whom nearly fifty per cent are Swedish. The area of the city is eight square miles.

The city is situated on hills at an altitude of 1,300 feet, more than 800 feet higher than Lake Erie. Allen, Dow, Jones and Baker parks and Celoron, an amusement resort on the lake, are places of interest. The Federal building, the Y. M. C. A. and Y. W. C. A. buildings, the municipal hospital, city hall, furniture exposition building and James Prendergast Free Library are noteworthy structures. The Agnes Home for Working Girls and the Women's Christian Association Hospital are prominent institutions.

The city has become a manufacturing place of importance as a result of its water power and a large supply of natural gas obtained from Pennsylvania. The many industrial enterprises include fifty furniture factories, extensive worsted mills, canning factories, and manufactories of stained glass.

Jamestown was named in honor of James Prendergast, the first settler. The town was founded in 1810, incorporated in 1827, and chartered as a city in 1886. The municipality owns the waterworks, electric light and power plant, hospital and market. F.C.B.

JANESVILLE, WIS., noted for its tobacco industry, is the county seat of Rock County. It is situated on both sides of the Rock River, in the extreme southern part of the state. Madison is thirty-nine miles northwest, Milwaukee is seventy-one miles northeast and Chicago is ninety-one miles southeast. The city is served by the Chicago & North Western Railway, constructed to the city in 1863, and by the Chicago, Milwaukee & Saint Paul Railway, built to this point in 1854. Electric lines extend to towns south. Janesville was settled in 1836, was incorporated in 1853 and adopted the commission form of government, with three elective officers, in 1912. It was named in honor of one of the first settlers, whose name was Janes. Germans predominate among the foreign born of the population, which increased from 13,894 in 1910 to 14,339 in 1916. The area exceeds seven square miles.

The city lies mostly in the bottom-lands of the river, between bluffs which rise to a height of 100 feet. Four bridges span the river at this point, and the dams constructed conserve the water power for numerous manufacturing establishments. Most important among these are wagon and carriage and furniture factories, cotton and woolen mills, boot and shoe factories, flour mills and manufactories of fountain pens. The section around Janesville is one of the richest agricultural districts in the Northwest, the yield of tobacco being especially abundant; each year great quantities of leaf tobacco are packed and stored.

The city has a Federal building, constructed about 1905, a city hall, a public library, built in 1908, and a Y. M. C. A. building. It is the seat of the state institution for the blind. In addition to its public school system it has Saint Joseph's Convent and a business college. O.S.M.

JANIZARIES, *jan i za riz,* a body of picked troops which gained great power and influence in the Turkish Empire. Part of them constituted the body guard of the sultan, part of them in times of peace did general police duty. At the height of their power the standing force numbered from 25,000 to 100,000, while of trained "militiamen" there were almost 400,000. In time the janizaries became so powerful and unruly that in 1826 the organization had to be abolished by force. Over 20,000 were banished, and nearly as many more were put to death.

JANUARY CALENDAR

Birthdays

1. Paul Revere, 1735
2. James Wolfe, 1727
3. Cicero, 106 B. C.
4. Jacob L. C. Grimm, 1785
6. Joan of Arc, 1412
7. Israel Putnam, 1718
8. James Longstreet, 1821
   Wilkie Collins, 1824
10. Ethan Allen, 1737
11. Alexander Hamilton, 1757
    Sir John A. Macdonald, 1815
12. Edmund Burke, 1729
    J. H. Pestalozzi, 1746
13. Salmon P. Chase, 1808
14. Benedict Arnold, 1741
15. Molière, 1622
16. Robert W. Service, 1876
17. Benjamin Franklin, 1706
18. Daniel Webster, 1782
19. James Watt, 1736
    Robert E. Lee, 1807
    Edgar Allan Poe, 1809
21. John C. Fremont, 1813
    "Stonewall" Jackson, 1824
22. Francis Bacon, 1561
24. Charles James Fox, 1749
25. Robert Burns, 1759
27. Mozart, 1756
    Emperor William II, 1859
28. Charles George Gordon, 1833
    Alexander Mackenzie, 1822
29. Thomas Paine, 1737
    William McKinley, 1843
30. Walter Savage Landor, 1775
    Charles, Baron Metcalfe, 1785
31. Ben Jonson, 1574
    Gouverneur Morris, 1752
    Franz Schubert, 1797

Events

1. People everywhere confidently expected the second coming of Christ, 1000
   Ireland became a part of the United Kingdom, 1801
   Greece declared itself independent of Turkey, 1822
   Lincoln issued Emancipation Proclamation, 1863
   Commonwealth of Australia proclaimed, 1901
2. Battle of Murfreesboro, 1863
   Port Arthur surrendered to the Japanese, 1905
3. Second partition of Poland, 1795
4. Utah admitted to the Union, 1896
6. Battle of Ladysmith, in South African War, 1900
7. First Presidential election held in United States, 1789
8. La Salle reached Niagara Falls, 1679
9. Napoleon divorced Josephine, 1810
10. Stamp Act passed by Parliament, 1765
    England adopted penny postage, 1840
12. Arbitration treaty signed by Canada and United States, 1909
13. Congress decided that the American Colonies should have a new flag, 1777
14. Norway was united with Sweden, 1814
    Kingston, Jamaica, nearly destroyed by an earthquake, 1907
15. Queen Elizabeth crowned, 1559
    British Museum opened, 1759
16. Kingdom abolished in Hawaii, 1893
17. Battle of the Cowpens, 1781
18. William I proclaimed German emperor, 1871
19. Order of the Garter established, 1350
    Body of Columbus transferred to Havana, 1796
    Discovery of gold in California, 1848
20. First session of English Parliament, 1265
    Emperor of China abdicated, 1912
21. Execution of Louis XVI of France, 1793
    Corps of Canadian mounted riflemen sent to Boer War, 1900
22. Edward VII became king of England, 1901
23. Kansas-Nebraska Bill introduced in Congress by Stephen A. Douglas, 1854
    France annexed Madagascar, 1896
    Battle of Spion Cop, 1900
24. Prussia annexed Schleswig-Holstein, 1867
    Naval battle in North Sea, 1915
25. Robert Young Hayne began his great debate with Webster, 1830
26. Webster's reply to Hayne, 1830
    Michigan admitted to the Union, 1837
27. Charles I sentenced to death, 1649
    The Canadian Great Western Railway opened, 1854
    Charles George Gordon murdered, 1885
    A treaty settling the fishing question signed by Newfoundland and the United States, 1909
28. Paris surrendered to the Germans, 1871
29. Kansas admitted to the Union, 1861
30. Charles I beheaded, 1649
    Earl of Elgin became Governor-General of Canada, 1847
    Alaskan boundary dispute between Great Britain and United States settled by treaty, 1897
    Russians occupied Tabriz, 1915
31. The *Great Eastern*, largest steamer then in existence, launched, 1858

For Study

Bayberry
Burns' *To a Mouse*
To a Mountain Daisy
Fire
Franklin's boyhood
Freezing
Grimms' *Fairy Tales*
Janus
Paul Revere's Ride
Snow
Steam
Steam Engine

QUOTATIONS FOR JANUARY

1. Ring out, wild bells, to the wild sky,
The flying cloud, the frosty light;
The year is dying in the night;
Ring out, wild bells, and let him die.
Tennyson.

2. Ring out the old, ring in the new,
Ring, happy bells, across the snow;
The year is going, let him go;
Ring out the false, ring in the true.
Tennyson.

3. More helpful than all wisdom is one draught of simple human pity that will not forsake us. *George Eliot.*

4. Chill airs and wintry winds! My ear
Has grown familiar with your song;
I hear it in the opening year—
I listen, and it cheers me long.
Longfellow.

5. Good health and good sense are two of life's greatest blessings.
Publius Syrus.

6. So long as we love, we serve;—and no man is useless while he has a friend.
Stevenson.

7. Better to hunt in fields for health unbought
Than fee the doctor for a nauseous draught.
The wise for cure on exercise depend;
God never made his work for man to mend. *Dryden.*

8. Cleanness of body was ever esteemed to proceed from a due reverence to God, to society and to ourselves.
Bacon.

9. In rigorous hours, when down the iron lane
The redbreast looks in vain
For hips and haws,
Lo, shining flowers upon my window-pane
The silver pencil of the winter draws.
Stevenson.

10. Now, good digestion wait on appetite,
And health on both. *Shakespeare.*

11. For strength to bear is found in duty done,
And he is blest indeed who learns to make
The joy of others cure his own heartache. *Drake.*

12. Example is the school of mankind, and they will learn at no other.
Burke.

13. Old Winter is a sturdy one,
And lasting stuff he's made of;
His flesh is firm as ironstone,
There's nothing he's afraid of.
German Song.

14. Health is the second blessing that we mortals are capable of—a blessing that money cannot buy. *Walton.*

15. He prayeth best who loveth best
All things both great and small;
For the dear God who loveth us,
He made and loveth all.
Coleridge.

16. Health is the vital principle of bliss,
And exercise of health. *Thomson.*

17. For want of a nail the shoe was lost; for want of a shoe the horse was lost; for want of a horse the rider was lost. *Franklin.*

18. God grants liberty only to those who love it, and are always ready to guard and defend it. *Webster.*

19. These winter nights, against my window-pane
Nature with busy pencil draws designs
Of ferns and blossoms and fine spray of pines,
Oak-leaf and acorn and fantastic vines,
Which she will make when summer comes again. *Aldrich.*

20. Cleanliness is indeed next to godliness.
Wesley.

21. Nor love, nor honour, wealth nor pow'r
Can give the heart a cheerful hour
When health is lost. *Gay.*

22. Some books are to be tasted, others to be swallowed, and some few to be chewed and digested. *Bacon.*

23. I block the roads and drift the fields with snow,
I chase the wild-fowl from the frozen fen;
My frosts congeal the rivers in their flow,
My fires light up the hearths and hearts of men. *Longfellow.*

24. No one is useless in the world who lightens the burden of it for anyone else. *Dickens.*

25. A prince can mak a belted knight,
A marquis, duke, and a' that;
But an honest man's aboon his might,
Guid faith, he maunna fa' that.
Burns.

26. E'en from the body's purity, the mind
Receives a secret, sympathetic aid.
Thomson.

27. It is more blessed to give than to receive. *Bible.*

28. Ah, may I be as cheerful
As yonder winter birds,
Through ills and petty crosses,
With no repining words. *Cooper.*

29. Keep clean, be as fruit, earn life, and watch
Till the white-winged reapers come.
Vaughan.

30. I strove with none, for none was worth my strife;
Nature I loved, and next to Nature, Art.
I warm'd both hands against the fire of life,
It sinks, and I am ready to depart.
Landor.

31. It is not growing like a tree
In bulk, doth make man better be,—
In small proportions we just beauties see,
And in short measures, life may perfect be. *Jonson.*

JANUARY, *jan'u ari*, the first month of the year according to the modern calendar. It is a time of beginnings, and the Romans signified this fact by naming it after Janus, the god of beginnings, whose festival fell within the month. He was a double-headed deity, with one face looking forward and one looking backward, and this is symbolical of the month, which inspires thought of the past as well as of the future. The special flower for the wintry month of January is the snowdrop; the garnet is its gem.

Its History. Like February, January was not one of the original months, the year according to the earliest Roman calendar having begun with March. Numa Pompilius, tradition says, added January, but gave it only thirty days; but the reforms of Julius Caesar gave it the thirty-one days which it has kept ever since (see CALENDAR). Its character has won for it various names in different countries. The Scandinavians, for instance, called it after Thor, the god of storms; and the old Anglo-Saxons spoke of it as Wolfmonth, because during its bitter cold days the wolves, who could find nothing alive in the forests on which they could live, came into the villages in search of food.

Its Place in the Year. In most parts of the northern hemisphere January is the severest of the winter months. In such sections as California and the Southern states, where winter, as Canada and the Northern United States understand that term, is unknown, January is likely to be a very rainy season, but elsewhere there is generally much sun and a prevailingly low temperature. Toward the end of the month, however, there occur frequently days which are warm enough for March, and the "January thaw" which accompanies these is a well-known phenomenon.

No month of the year has fewer signs of nature's activities. There is less movement among the birds than during any other month —the all-winter residents have arrived and settled down; those which go south for the winter have left long before, and the hardiest of the spring migrants have not started north. The cold does not seem to affect the birds seriously, neither do the storms; but they must have food, and plenty of it; and food is scarce in Northern latitudes in January. Where berries or grain are to be found, there birds, even of those species which usually winter far south, occasionally stay through the entire season.

January has one holiday universally observed in Christian countries—New Year's Day (which see), which has in every land its own characteristic customs. The other special day of most importance is Twelfth Day, so called because it is the twelfth day after Christmas, on which is celebrated the festival of the Ephiphany.

On pages 3112 and 3113 will be found calendars of birthdays and events, and a list of quotations for January. (See, also, other months.)

JANUS, in Roman mythology, the god for whom the first month of the year, January, was named. As the "spirit of opening," he was invoked at the beginning of all undertakings, and therefore was naturally the god of the beginning of the day and also of the beginning of the year. As the guardian of all the gates in Rome, he was usually represented as having a double head that looked both ways. In time of war the gates of the chief temple of Janus at Rome were always left open, and in peace were closed. As the god of gates he is represented as carrying keys, and is crowned with laurel. Many ceremonies were performed in his honor.

Janus am I; oldest of potentates!
Forward I look and backward and below.
I count—as god of avenues and gates—
The years that through my portals come and go.
—LONGFELLOW.

JAPAN, *ja pan'*, an island-empire lying in the Eastern Pacific Ocean, called by its own people NIPPON, or "the origin of the sun," for the continent of Asia to the west sees the sun emerge, apparently, from the myriad islands of Japan. "Myriad" is an accurate and not a mere poetic term here, for there are about four thousand islands in the Empire. Most of them are tiny—mere shrubbery-grown rocks which rise steeply out of the ocean; and fewer than one-eighth of them are inhabited or have a coast line of more than two and one-half miles.

Like its neighbor to the west, China, Japan has taken its place among the powers of the world only recently, having spent the centuries on centuries of its existence shut up within itself, rejecting progress, resisting every advance of the Western nations, to which it was an impenetrable but fascinating mystery. Like the other countries of the Orient, it found a place in the hazy geography of the Middle Ages, and the heart of Europe yearned toward it, for within its borders, it was believed, were countless riches and beautiful things. *Cipango* it was called by Europeans, and explorers sought for its shores; and to the day of his death Columbus thought that he had reached not a new world with its wealth all undeveloped, but Cipango the marvelous, the long-sought-for.

To-day, as India and Egypt stand to the average reader for romance and Oriental mystery, Japan stands for beauty. Its dainty women, its cherry blossoms, wistaria and chrysanthemums; its picturesque temples, its artistically-bridged streams, and above all its famous sacred mountain of Fujiyama—all of these form definite pictures in the imagination. That this nation of little people, beauty-loving, suave and gentle, should have placed itself so quickly among the world's great military and naval powers after its interest was awakened is one of the miracles of modern times.

Location and Size. The islands which compose Japan form a chain about 2,400 miles in length to the east of Asia, and are separated from the continent by the Sea of Japan and Korea Strait. There are five chief islands, of which Hondo or Honshiu, or as it was formerly called, Nippon, is the largest and most important—in effect, the mainland. The area in square miles, coast line and population of these principal islands are as follows:

ISLAND	AREA	COAST LINE	POPULATION
Hondo	87,426	5,930	41,505,809
Shikoku	7,083	1,628	3,293,413
Kiushiu	15,703	4,506	7,979,928
Yezo	36,570	1,533	1,817,706
Formosa	13,944	860	3,390,452

But the totals of these by no means give the correct statistics for the Empire. The estimated area, exclusive of Korea, which was annexed to Japan in 1910 (and is treated in a separate article), is almost 175,000 square miles, or about a tenth greater than the combined areas of the American North Atlantic states, while the total population is approximately 51,902,000, more than half that of the entire United States and seven times that of the vast Dominion of Canada.

LOCATION MAP

A small ribbonlike string of mountainous islands in the sea whose people dominate the policies of the entire yellow race.

When Japan proper is spoken of, it must be understood as including the three large islands of Hondo, Shikoku and Kiushiu, the Loo-Choo Islands, fifty-five in number, and several hundred small islands; while the remainder of the possessions, including such large areas as Korea, Yezo, Formosa and Sakhalin, are in effect but colonies.

This island empire extends from latitude 20° 45′ to 50° 56′ north, and from longitude 119° 18′ to 156° 32′ east. It lies in about the same latitude as the United States, but because of the southwest monsoon the heat at some seasons is much greater than that of similar latitudes in Europe and America.

The People

Their Characteristics. In no other part of the world, perhaps, is there a more interesting people than the Japanese, nor one toward which more attention has been directed in recent times. They are of the Mongol race, closely related to the Chinese and the Koreans, though shorter in stature than either of those peoples. When Chinese and Japanese are thrown together in situations where distinctions of dress are lost, as in some American or European university, it is practically impossible to distinguish between the two.

Just what the mingling process has been from which the modern Japanese have evolved, students do not know, but they recognize among the inhabitants of Japan two distinct types. That with which the world is familiar from the everywhere-present Japanese print is the fine or aristocratic type, by far the rarer of the two. It is distinguished by unusual stature, according to Japanese standards; by the oval head and face, well-shaped nose, almond eyes and pallid or slightly olive skin, and by the almost total absence of hair from the face. The people of the coarser type are shorter and stockier, have broader faces, darker skins and flatter noses; and have, on the whole, a more genial, good-natured expression. Since the early days of their history the Japanese have laid stress upon physical education, and some of their systems have become famous; yet they show a decided lack of physical development, and in their exercises depend rather upon quickness and agility than upon strength.

Many of the women, with their smooth skin, black hair and delicate hands, are very pretty in their youth—a peculiarly happy youth, for Japan has been called "the paradise of children"—but very few of them retain their good looks after their girlhood days have passed.

Mental and Moral Qualities. As alert mentally as they are physically and possessed in an unusual degree of the powers of imitation, the Japanese have profited by their contact with other nations, but have managed at the same time to keep the basic traits of their character unchanged. No characteristic is more prevalent than their gaiety and love of laughter. The cheerful looks noticeable in a crowd of holiday-makers are not masks for the occasion; they are evidence of deep-seated contentment. Even though he has troubles, the Japanese has been taught that it is a disgrace to air them in public, either by gloominess or by ill-temper. Courteous, kind, brave, the Japanese down to the lowest classes have many very attractive qualities; but a certain deceitfulness is associated with their extreme politeness, while a total lack of consideration for women is a very unpleasant part of their nature.

Living in a land with so much beauty about them, it seems but natural that the Japanese should be themselves producers of beauty, and indeed their art works and their manufactured products are sought the world over (see subheads *Manufactures* and *Art,* below).

Mode of Life. A Japanese house seems to a visitor from America or Europe a rather unsubstantial structure. It is usually of one story, is built of wood, and has sliding screens of paper instead of windows, doors and partitions, the outer ones backed by wooden shutters. On the floor are straw mats, and that these be thick and soft is a necessity, for they constitute the sleeping-place for the family. Since shoes must be removed on the porch, these mats do not get dirty as do the rugs in our homes. Beds, chairs, and draperies there are not, nor are there any tables except the low lacquered stands on which the food is served. Desks for reading and writing, however, are common.

Except in the poorer districts, rice is the staple food, and with it is served fish, seaweed, eggs, beans or something else to give it flavor, or perhaps only the sauce made from soy beans. Tea is used everywhere, and the common fermented drink is called *saké.*

The dress varies much, according to the wealth and position of the wearer; the peasants, whether men or women, have as their regular costume slips of coarse cotton, while the higher classes wear robes of silk, sometimes embroidered and often of great value. All the costumes are alike in one respect, however; they are loose, and allow the greatest freedom of movement. The graceful, flowing robe of the women has been introduced into Western countries, where it is much used as a lounging costume, under the name *kimono.* The Japanese woman, however, does not wear hers hanging free, but confines it with a silken girdle, called the *obi.*

Education. The present system of education is not an outgrowth of the old native systems, but has been worked out according to Ameri-

can and European models; and for a long time after Japan opened its doors to Western influence there was a constant call for educated foreigners who could assist in building up a system. To-day education is compulsory between the ages of six and ten, and while it is not free, the school boards are compelled to provide tuition for those too poor to pay. There are kindergartens, elementary and middle schools, normals, and three national universities; while of technical and special schools there is a fair number. One decided sign of the progress of Japan within the last few decades has been the growing care for the education of girls, who receive the same instruction as the boys and are as well represented in the schools. Much help toward such progress has been given by the mission schools, the first institutions within the Empire to concern themselves with the teaching of girls.

The eagerness with which Japanese students have accepted education according to Western standards has been wonderful, but sometimes it almost seems that the change came too suddenly. Many a young man, attempting to attend the university and at the same time support himself, has found the struggle too difficult and has taken refuge in suicide. In-

A TORII GATE

Such a fantastic structure is usually placed before the entrance to some sacred place and also is seen in harbors and water-ways. It is a superstition of Japanese sailors that fair weather and success will attend them on a voyage if their craft is sailed beneath the lintels of the torii. Only very small boats can actually pass through the gate.

deed, there are periodic epidemics of suicide on the part of young men, and authorities can account for such a fact among so cheerful a people only on the grounds of a too great mental strain.

Religion. Japan is a land of temples, but its people are not especially religious, as that word is understood among Western peoples. All faiths are tolerated, and Christianity has made considerable progress under the protection of the government, the various sects possessing a total membership estimated at about 150,000. But by far the greater number of the inhabitants profess either Shintoism or Buddhism. The former is a sort of a nature worship which peoples the world with innumerable deities, chief of whom is the sun-goddess, from whom the mikados, or emperors, are supposed to be descended. This original religion of the country has scarcely any services except occasional celebrations, and it exercises very little influence, whether for good or ill, on the lives of the people.

Buddhism claims the majority of the people, many of the Shintoists being Buddhists as well, and that despite the fact that the government has since 1871 frowned upon this imported religion. It has scores of thousands of temples, some of them large and gorgeous, and its high priests number over 50,000.

Language and Literature. The language of Japan stands almost by itself, not being related, as are its people, to the Chinese. For the Chinese tongue has only monosyllables, while the Japanese may have long words like the English. Very many Chinese words have been introduced, some so long ago that they have lost their identity, and some more recently, but they are not pronounced as the Chinese pronounce them. Japanese is an inflected language, but not strongly so. In writing Japanese the ideographs, or modified picture-writings, of China are used, though they have been changed to fit the many-syllabled character of the language. Many of the books —in fact practically all those on serious or technical subjects—are written in Chinese, while Japanese is the language of pure literature, such as poetry, the drama and the essay. Many Japanese are learning the English language.

Japanese literature includes poetry and stories, which critics commend highly; plays, of which the Japanese as a people are especially fond; history, geography and works on the various sciences. Most of the last writings are very modern, dating from the years since the opening-up of the country to Western civilization, about 1854. The literature of old time concerned itself very largely with religious doctrines. Romances and short poems, travels and diaries there were in earlier days, but they were few in number and very restricted in

their influence. In fact, Japanese literature is too new to make prediction possible, but critics believe that a people so capable of receiving inspiration and suggestion from outside sources, without servile imitation, are bound to produce a literature which shall do justice to the awakened, progressive nation.

Art. The very name *Japanese art* brings up mental pictures of exquisite pottery ware, gleaming lacquers, embroidered silks, enamels, finely wrought mosaics and pictures remarkable for their ability to produce a clear effect with a few simple lines. The Japanese as a people are remarkably artistic, and the simple, unfurnished rooms of their houses are always ornamented with pictures, either hanging on the wall or executed directly upon the sliding screens. Most of the pictures are unframed, all of them are unglazed, and the material upon which they are made must thus be some fairly durable substance, as silk. Japanese pictures ignore perspective entirely; they show no softening shadow effects, but on the other hand they display a remarkable genius for composition, a fine sense of the harmony of color, and a knowledge of everything that a line can be made to express. The sacred mountain appears in many pictures.

In the other fine arts Japan does not excel, but many of its mechanical arts are unsurpassed elsewhere. The crackled Satsuma ware; the cloisonne enamels; the ivory carvings; the gold-decorated lacquer; the pictures done in embroidery—these the workmen of other lands would find it impossible to duplicate, and much of Japan's export to Western countries consists of such articles. See *Manufactures*, below.

The Land

Surface. Japan was built up by volcanoes, and its surface is in general mountainous, a main range following the crescent-shaped curve of the principal islands. Hondo, the largest of the islands, which is 700 miles in length, is traversed from end to end by this range, and only in the neighborhood of Tokyo is there a plain of any considerable extent. Smaller ranges cross this main one at intervals, and at the intersections the greatest altitudes and the grandest scenery are found. The valleys are deep and steep of slope, and are broken up into many little plains, but whether the surface be high or low, level or broken, vegetation is everywhere, the whole Empire presenting a picture in varying shades of green.

Volcanoes are numerous, and while most of them are extinct some still belch forth steam and occasional lava flows, while now and again one breaks out and does serious damage (see *History*, below). The loftiest peak in the Empire is Mount Morrison, in Formosa, 14,300 feet in height, but by all means the most famous is Fujiyama, "the Peerless," which is 12,395 feet in height. This symmetrical peak, almost a perfect cone, from which no eruption has taken place since 1708, can be seen from far out at sea; and Japanese artists are very fond of introducing its snow-crowned slopes into their decorative schemes. See FUJIYAMA.

Waters. Narrow islands, everywhere ridged with mountains, give small opportunity for rivers of any great size, but the streams are numerous and picturesque, though of no particular use for navigation. Down every valley rushes a little river, and waterfalls are a very common feature of the scenery. In the island of Yezo is the largest river, the Ishikari, which has a course of 275 miles, while Hondo has three rivers of note, the Shinano, 215 miles in length, the Tonegawa, 177 miles, and the Kisogawa, 115 miles. Even after these streams reach level ground they are so impeded by shallows and rapids that only broad, flat-bottomed boats can navigate them.

Japan has many beautiful lakes in its mountain regions, and to them tourists flock. Most famous of all is Lake Biwa, or Omi, in Omi, the south-central part of Hondo, which is almost equal to the famous Swiss lake, Geneva, in size, and is noted for its eight specially delightful views called "Eight views of Omi" by the Japanese. In the region of the lakes there are many hot springs whose mineral waters have curative properties.

Climate. By reason of its great north-and-south extent, Japan has a climate that varies widely in the different parts of the empire. In Formosa and the Loo-Choo group, subtropic conditions prevail; snow never falls, and the summers are long and very hot. But far to the north, in Sakhalin and the Kurile Islands, the winter cold is almost arctic in its intensity, and snow lies in the hollows the year round. In the central part of the Empire, near the capital, the climate is equable and for the most part delightful, though a brief period in summer is likely to be very hot and

TRULY A FAIRYLAND.

Not all of Japan is so wondrously fair, but this teahouse in Saikio is typical of thousands as beautifully situated.

'NEATH FROWNING FUJIYAMI.

A tea-picking scene in enchanting Japan, with the perfect cone of the "sacred mountain" in the distance.

humid. Indeed, an excess of moisture is one of the chief characteristics of the climate as a whole, and fogs are frequent.

The average annual rainfall is heavy, practically every part of the Empire having more than fifty inches; but as much of this does not fall during the growing season, irrigation is necessary at times. Fierce storms of rain and wind are frequent and do great damage, both during their course and by reason of the flooding of the rivers afterwards. These storms are most numerous in autumn.

Resources and Industries

Minerals. In the seventeenth and eighteenth centuries, when the European nations were making first acquaintance with Japan, it was gold and silver which they coveted, and they carried away with them millions of pounds of these precious metals. To-day the supply of both is comparatively small, but constant efforts are being made to develop new mines. Copper, too, the early traders obtained from Japan, and of that metal there is still a large yield. It is difficult to estimate the quantity of copper which, after the introduction of Buddhism, was cast into images.

Coal of various grades is fairly plentiful, and is mined in large quantities in Yezo, Kiushiu and Formosa, the output being well over 20,000,000 tons a year; and iron, too, is found in paying quantities. There is a huge supply of sulphur, and petroleum is one of the more recent mineral developments. But all in all, it cannot be said that Japan has great mineral wealth.

Fisheries. The fisherman in Japan is a very important person, furnishing to the people one of their staple articles of food. It is estimated that more than a million and a half persons are engaged in fishing or in some of the industries that grow out of it, and that no fewer than four hundred products of the sea appear on Japanese tables. Among the most important fish are mackerel, salmon, haddock, halibut, flounder, trout, tunny and eel, and various manufactured products are made from the parts that are not eaten.

Agriculture and Vegetation. As fish is the chief animal food, so rice is the chief vegetable, and as the national drink, *saké*, is made from this grain also, the yield must of necessity be very large. Indeed, one of the most characteristic sights in all Japan is its rice fields or paddy fields. Wherever the land can be irrigated it is divided by ridges of grass into little muddy plots, and in these the rice is planted. Ditches, divided and subdivided until they are but tiny trickles, supply the necessary water, for the paddy fields are kept flooded until just before harvest time. On land which will not produce any of the two hundred or more kinds of rice which are known to the Japanese, other grains, especially barley and wheat, or potatoes, soy beans, cotton, tea, tobacco or sugar are grown. In some parts of the Empire fruits are produced, but except for the big Japanese persimmon and the mandarin orange they do not thrive especially well. Altogether, only about one-sixth of the land is fitted for cultivation, so mountainous is the country; and none of the soil, after thousands of years, is especially fertile. But the Japanese are a very painstaking people, and have brought intensive farming to a higher state than most other peoples.

It is but recently that stock-growing has received much attention, and only now are the Japanese beginning to be well acquainted with butter, milk, cheese and beef as articles of food. Even to-day the stock and dairy industries are of very minor importance, despite the interest which the government has shown in them.

Vegetation. This is especially luxuriant, owing to the warm climate and the excessive moisture, and constitutes the chief beauty of Japan. The people love flowers, for centuries have cultivated them carefully, and have special festivals at periods when the land is abloom with some favorite blossom. In February come the plum flowers; two months later the cherry, the "soul of Japan," and visitors to Japan are fond of timing their trips so that they may reach the country during cherry-blossom time. Next comes the exquisite wistaria, then the azalea, the iris and the peony, this last regarded with a special affection; and then, in November, comes the crowning glory of the year, the gorgeous chrysanthemum, which Japanese gardeners have brought to a high state of perfection, and which has become the national flower. Trees grow everywhere, especially in the mountains, and nowhere can there be seen more beautiful autumn color effects.

Manufactures. There are two classes of industries in Japan, the old historic pursuits,

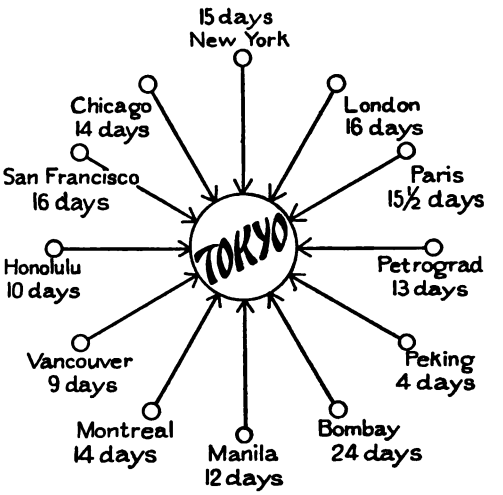
which are carried on in the homes of the workmen, and the modern industries which have been introduced from the Western countries. The former are the more interesting and characteristic. Their products include the lacquer work, pottery, embroideries and carvings mentioned above, as well as paper of very special quality, silken and brocaded fabrics, and metal objects.

The introduced industries, which are mostly carried on in quite the modern way, in large factories with mechanical power, include textile-making, cotton taking first rank; the manufacture of paper, matting, glass, bricks and matches; and shipbuilding and machinery-making. The operatives in factories receive lower wages than those of Europe or America, but the scale of living is much lower also, and the amount of skill required is less, as the articles do not for the most part compare in quality with the best output of European and American factories.

Transportation and Commerce. Of railways, considering its island character and its brief existence as a modern nation, Japan has a very considerable mileage—no less than 7,067 miles, including the South Manchuria Railway, on the continent. Since 1907 almost all the railroads have belonged to the government, which will within a few years control them all. Beginning with the road from Tokyo to Yokohama, opened in 1872, lines have been extended until to-day all the chief cities on the large islands are connected with each other. There are also nearly a thousand miles of electric railway in operation, and attempts are being made to improve the ordinary roads, which are generally in very poor condition. The common vehicle in which passengers are jolted over these roads is the 'riksha (see JINRIKISHA), a light, two-wheeled carriage somewhat like a sulky, but drawn by a man instead of a horse.

Japan's facilities for communication by sea are excellent, for its harbors are good and its coast line extensive. It has developed a large merchant marine, which includes no fewer than 2,000 steamers and 7,000 sailing vessels, and its ships may be seen in most of the great ports of the Pacific. Over fifty ships ply between Japan and the western coast of America.

The commerce of Japan had a comparatively recent origin, but has grown rapidly and is now extensive, the foreign trade amounting in a year to almost $700,000,000. The imports exceed the exports, but while the difference



COMMERCIAL DISTANCES FROM TOKYO

a few years ago was considerable it is to-day slight, for Japan is producing more and more of its own raw materials. The chief imports are raw cotton, rice, oil cake, sugar, machinery, iron and steel and wool, while the exports are largely raw silk, tea, cotton yarn, silk, copper and coal. The United States receives more of Japan's exports than any other country, China, France and England ranking next; but British India and Great Britain surpass the United States in the amount they send to Japan. Nearly all of Formosa's tea is sent to the United States.

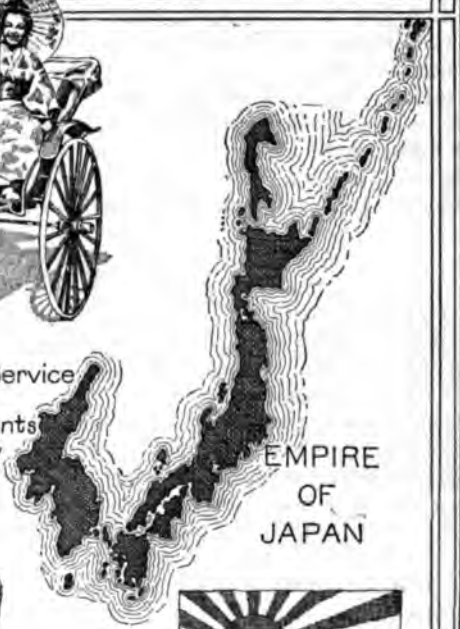
Government and Defense

Government. The constitution of 1889, patterned on that of Germany, makes of Japan a constitutional monarchy, with the hereditary emperor, or mikado, as the head. He must approve every legislative measure before it becomes a law; he appoints all civil and military officers and is commander-in-chief of the army and navy. There is an Imperial Cabinet, made up of the ministers of the nine departments, and a Diet, or legislature, of two houses.

The upper of these, the House of Peers, admits as members not only princes, marquises and a certain number of the lower nobles, but various "commoners" who are chosen by the emperor for special service rendered, or who pay very high taxes. This house has between

Jinrikisha Service for Sixty Cents a Day

The Chrysanthemum, the National Flower



EMPIRE OF JAPAN

Merchant Flag
Red White

Naval Flag
Red White

The Great Buddha

Geisha Girls

A Young Mother

three hundred and four hundred members. Members of the House of Representatives, 379 in number, are chosen by popular vote limited by certain income qualifications. Not all parts of the empire are represented, but the tendency is toward the extension of the franchise and toward making ministers responsible to the Diet instead of to the emperor.

The capital of the empire is Tokyo; the other cities of chief importance are Kyoto, Osaka, Yokohama, Nagasaki, Kobe, Hiroshima and Hakodate, the chief of which are described under their titles.

Army. The army of Japan, organized on a European basis in 1884, proved its efficiency in the successful struggles with China and Russia (see *History,* below). As in European countries, military service is universal, all able-bodied males from seventeen to forty being liable to service, and while the active army on a peace footing is 250,000, including officers and men, and on a war footing is about three times that number, it is estimated that 1,700,000 trained men could be quickly put into the field; and the total number who could be called upon is not far below 3,250,000.

Navy. Only since the war with China has Japan had a navy worthy to rank with the navies of the other great countries. In 1916 it stood fifth among the naval powers of the world, ranking next below the United States, with twelve dreadnoughts, thirteen older battleships, thirty-seven cruisers, thirty-seven torpedo boats, sixty destroyers and fifteen submarines. The officers and crews number about 51,000, but this is capable of rapid increase.

History of Japan

Formative Period. The very early days of Japan are as hazy as are its own landscapes in the foggy season. Here and there a figure looms, as Jimmu Tenno, who is supposed to have founded the present reigning dynasty in 660 B. C.; but the outlines are not distinct, and the mist soon settles down again. After A. D. 500 facts may be stated more definitely, the first certain event being the arrival from Korea in 652 of Buddhist missionaries; the next, the opening up of that intercourse with China which resulted in the acceptance of Chinese standards and Chinese civilization. The centuries that followed saw a marked growth in culture, and especially a centralization of the government. In these early years, too, began that seclusion of the mikado which until very recent times served to make him in the eyes of his people a sort of divine mystery, reverenced, but not loved.

The Middle Age. This was for the most part a period of civil strife, lasting from the twelfth to the seventeenth century. The military caste became very strong, and the chief general, or *shogun,* gained a power which was far greater than that of the emperor. In time the mikado became almost a myth, and it was the able shogun Iyeyasu who in the late sixteenth and early seventeenth centuries restored a measure of tranquillity to the strife-torn country and established finally that feudal routine from which Japan did not emerge until the middle of the nineteenth century. Meanwhile, in 1542, Portuguese Roman Catholic missionaries had brought to the island empire Christianity, which in spite of opposition spread rapidly.

Foreign Intercourse. For a time the Portuguese had trading relations with Japan, but in the sixteenth century these were forbidden, and for more than two centuries the empire remained shut up within itself. The avowed principles of the government were to "prevent the introduction of new ideas" and to "preserve unchanged the condition of the native intelligence," and foreign vessels were not allowed to touch at any Japanese port. But in 1854 Commodore Matthew C. Perry appeared in a Japanese harbor with a squadron of United States vessels, and fairly forced from the secluded nation a treaty of friendship and commerce. Other countries were not slow to take advantage of this American success, and port after port was opened up to trade. Bitter was the protest on the part of the "Japan for Japanese" patriots, but the other policy prevailed and the seclusion of Japan was ended. In 1867 the shogun was forced, by reason of his reactionary tendencies, to resign, and in the next year the office was abolished. What was virtually a new empire was created. American and European educators, statesmen, soldiers and seamen were invited to reorganize practically every department of the national life; Western laws were introduced, feudalism was abolished, and in 1889 a constitution was proclaimed. The court emerged from its long seclusion, and the Japanese had the pleasure of seeing their ruler at public gatherings, as Western peoples are wont to do.

OUTLINE AND QUESTIONS ON JAPAN

Outline

I. Location and Size

(1) An island empire
(2) Relation to Asia
(3) Chief islands
(4) Total area
(5) Population

II. Its Geography

(1) Mountainous, volcano-built country
(2) Fujiyama
(3) Rivers
(4) Lakes
(5) Climate

III. Industries and Communication

(1) Agriculture
  (a) Intensive character
  (b) Chief crops
(2) Mining
(3) Manufacturing
  (a) In the homes
  (b) In factories
(4) Fisheries
(5) Transportation
  (a) By sea
  (b) By rail
  (c) The 'riksha
(6) Commerce

IV. The People

(1) Racial peculiarities
(2) Mode of life
(3) Education
(4) Religion
(5) Language and literature
(6) Art

V. Government and Defense

(1) Departments of government
(2) Army
(3) Navy

VI. History

(1) The early days
(2) Beginnings of foreign intercourse
(3) New Japan
(4) Its modern wars

Questions

Why do not the rugs in a Japanese house get as dirty as those in a house in America?

What part do flowers play in the life of the Japanese?

What quality of these people has enabled them to profit greatly from their intercourse with other nations?

How do the Japanese treat their women?

If all the people in Japan who engage in fishing or some industry growing out of it lived in one city, which city of the United States would it most closely resemble in size?

What did the early explorers go to Japan for?

What two larger nations did Japan defeat in war? What was the effect on Japan?

How do the two types of Japanese differ from each other?

Why is one Japanese mountain familiar the world over?

What was the "frog in a well" period of Japanese history?

What are the chief merits of Japanese pictures? The chief defects?

Who were the *shoguns?* When did the last shogun lose his power?

What famous explorer thought he had discovered Japan?

Does the multiplicity of the temples in Japan indicate truly the religious character of the people?

What is the first definite fact in Japanese history?

What do the Japanese call their country? What is the origin of the name?

What connection has there been between education and suicide in Japan?

What is the ordinary carriage in which passengers ride?

A Period of Wars. Marvelous indeed was the progress made, and one of the nations which viewed it with great jealousy was China. War between the two powers broke out in 1894, disagreement over Korea being the main cause, and Japan was completely successful. The navy of China, upon which it had placed its chief reliance, was destroyed, and China was forced to sue for peace. During the Boxer Movement in China the new "great power" fought side by side with the Western powers, and at the close of the struggle claimed recognition; and even then Japanese statesmen protested against the Chinese concessions which were allowed to Russia. In 1904 Japan entered upon the greatest struggle in its history—the war with Russia, from which it emerged victorious (see RUSSO-JAPANESE WAR).

Later events include the Anglo-Japanese Alliance of 1905; the annexation of Korea in 1910; the death of the Emperor Mutsuhito, who had reigned all during Japan's "modern" period, from 1868, and the accession of his son Yoshihito in 1912; strained relations at various times with the United States because of California laws which discriminated against the Japanese; the disastrous volcanic eruption of January 12, 1914, during which hundreds of lives were lost; and, finally, the entrance of Japan into the great War of the Nations in 1914. As the ally of England Japan declared War against Germany and attached and took the strong fortress of Tsingtau in Kiao-chow, disclaiming, however, any intention of retaining permanently the territory thus gained. At the proper moment it is believed it will be restored to China. I.T.

Consult Wade's *Our Little Japanese Cousins;* Scidmore's *Jinrikisha Days in Japan;* Williston's *Japanese Fairy Tales;* Longford's *The Evolution of New Japan;* Seaan's *The Real Triumph of Japan.*

Related Subjects. The reader who is interested in Japan is referred to the following articles in these volumes:

CITIES

Kobe	Osaka
Kyoto	Tokyo
Nagasaki	Yokohama
Nagoya	

HISTORY

Boxer Rebellion	Port Arthur
China, subtitle *History*	Russo-Japanese War
Chosen	Shogun
Mikado	War of the Nations
Mutsuhito	Yoshihito

ISLANDS

Formosa	Loo-Choo
Kurile Islands	Saghalien

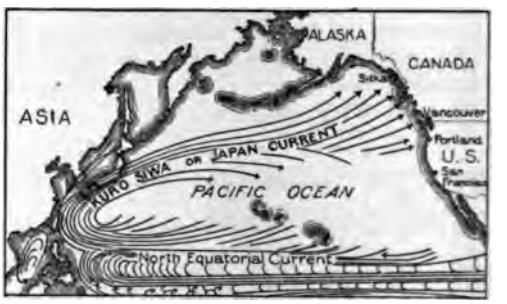
LEADING PRODUCTS

Bamboo	Persimmon
Bean	Rice
Enamel	Silk
Lacquer Ware	Tea

UNCLASSIFIED

Ainu	Jinrikisha
Buddhism	Jiu-Jitsu
Fujiyama	Kuro Siwo
Hara-kiri	Samurai

JAPAN CURRENT, or **KURO SIWO,** or **SIWA,** *koo'ro she'wo,* a warm current in the Pacific Ocean, corresponding in a general way to the Gulf Stream in the Atlantic Ocean. The name *Kuro Siwo* means *blue salt.* Sailors



THE JAPAN CURRENT

distinguish the current at sea by the deep blue of its waters and by the warmth that it brings from its tropical source. The south coast of Japan, along which it flows, enjoys a distinctly milder climate because of its influence. It was once generally believed that California and the west coast of North America owed their moderate temperatures partly to the warmth of the Japan Current, but this view is no longer held. The Japan Current originates in the north equatorial current along the southeast coast of Asia. It passes the east coast of Formosa, is deflected to the northeast and then heads toward the southwestern point of Japan. After passing the Kuriles and the Aleutian Islands, it spreads out and bends southward towards the coast of California. It has a lower temperature than the Gulf Stream and considerably less volume.

JAPANNING, *jap an'ing,* the art of applying to the surfaces of metal, wood, leather, *papier-maché* and other substances a variety of varnishes in imitation of the lacquered wares of Japan and China. Articles so coated are placed in stoves or hot chambers for the purpose of drying and hardening the varnishes. The various drying processes constitute the distinguishing features of this art.

Japanning owes its name to the famous lacquering of Japan, although the latter is

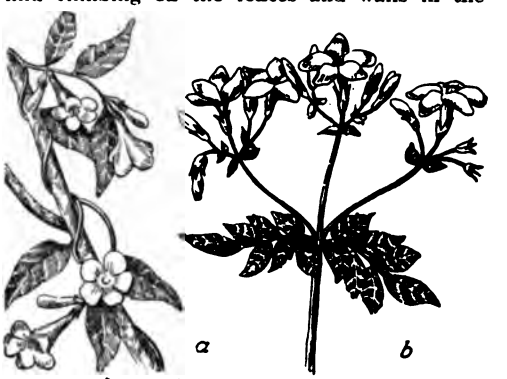
prepared with entirely different processes and materials. Japanning is a process between painting and enameling, and is extensively applied in the finishing of tea trays, domestic iron goods (such as coal boxes, cash boxes, deed boxes, etc.), clock dials and *papier-maché* articles; portable baths are usually finished internally in white japan, and a modified form of japanning is employed for patent leather.

Japanning is done in clear, transparent varnishes, in black, and in body colors; but black is most frequently used. For fine work, which is first smoothed and polished, several coats of varnish are applied in succession, each separately dried at a heat which may rise to 300° F. Gold or bronze bands or floral decoration are generally added; in such cases the design is painted on in japanner's gold size and the gold leaf applied, after which the objects are again placed in the oven and then additional coats of varnish are given. By japanning a brilliant polished surface is attained, which is more durable and less affected by heat and moisture than ordinary painted or varnished work.

JAPHETH, *ja'feth,* the youngest son of Noah, was born when his father was very old. On unusual occasions Japheth acted in a very kindly way towards his father, and in consequence received a blessing, the essential part being that he should occupy large territory and dwell in peace with his brother Shem. His descendants moved to the north and west of Canaan, occupying much of Europe, so he is considered the ancestor of the European races. Although the descendants of Shem and Ham attained an earlier distinction in the government and commerce of the world, those of Japheth now form the large Christian branch of civilization which rules the world with its modern culture. See NOAH.

JAPONICA, *ja pon'i ka.* See CAMELLIA.

JASMINE, *jas'min,* a genus of plants, related to the olive, natives of India and Persia, where one kind with double white blossoms is held sacred. The true jasmine is a vinelike plant ten or twelve feet high, with dark green leaves and white flowers, famous for their fragrance. The Spanish jasmine is a hardy bush about three feet high that is cultivated in Southern Europe for oil of jasmine, which is obtained by putting its blossoms between layers of oil-soaked cloth and allowing the oil to absorb their odor. The oil is pressed out, strained and purified into a delicate perfume called oil of jasmine. Another bushy jasmine grows in China; its flowers are used to scent teas, and from the berries the Chinese make a yellow dye. The most common of the American jasmines is the Carolina jasmine, that we find climbing on the fences and walls in the



Among the flowers no perfume is like mine;
That which is best in me comes from within.
So those who in this world would rise and shine
Should seek internal excellence to win.
—LELAND: *Jessamine.*

In the illustration (*a*) is branch, leaf and flower of Carolina jasmine; (*b*), the true jasmine.

Southern states of the American Union. Its bright yellow flowers have a heavy fragrance. The Cape jasmine, so common in the hot houses of the United States, Canada and England, is not a jasmine, but a gardenia (which see). The proper name of yellow jasmine is *gelsemium,* and it is described under that title.

JA'SON, in Greek legend, king of Iolcus, in Thessaly, who to regain for his father the throne usurped by his uncle Pelias, organized the Argonautic expedition in quest of the Golden Fleece. Victorious, he returned with his wife, Medea, who helped him to renew the youth of his father and to put to death the wicked Pelias. Jason and Medea then fled to Corinth, where sometime later he deserted her and married Glauce, the daughter of the king of that country. In revenge Medea sent a robe of cloth-of-gold saturated with a deadly poison which penetrated to the flesh of the wearer. The unsuspecting Glauce at once donned the garment, and after horrible sufferings expired. Then Medea slew her three sons. To avenge these deaths Jason started in quest of Medea, who passed over his head, gliding through the air in a golden chariot drawn by dragons. In despair Jason slew himself upon the threshold of his new home. See ARGONAUTS; MEDEA.

JAS'PER, a variety of quartz rock that is found in large quantities. It is of several colors—white, red, yellow, brown and black—

and these are sometimes arranged in layers. Jasper is a hard, strong rock, and takes an excellent polish. It is used for mantels, pillars and interior finishings, and often for the walls of buildings.

Jasper of the first quality, when polished, forms a gem of considerable value. It was one of the stones in the breastplate of the Jewish High Priest (*Exodus* XXXIX, 13) and is also mentioned in *Revelation* as one of the twelve stones in the foundation of the New Jerusalem (*Revelation* XXI, 19). The Greeks and Romans considered it to possess healing properties and believed that it would draw the poison from snake bites.

Jasper is found in many localities. Some of the best known quarries in the United States are at Pipestone, Minnesota, Sioux Falls, South Dakota, and in Colorado. A coarse variety of chalcedony (which see), commonly called jasper, was used by the Indians for arrow heads. It was this rock that Longfellow wrote of in *Hiawatha:*

> "At the doorway of his wigwam
> Sat the ancient arrow-maker;
> In the land of the Dacotahs,
> Making arrow-heads of jasper,
> Arrow-heads of chalcedony."

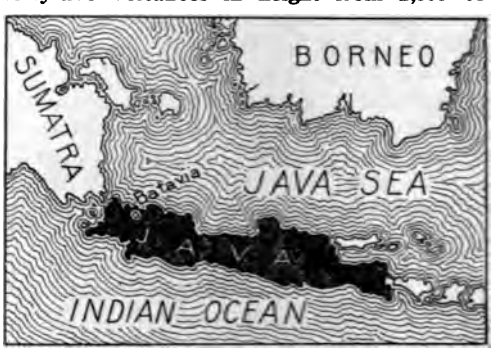
For picture showing position of the jasper in the breastplate of the Jewish High Priest, see HIGH PRIEST.

JASPER PARK. See PARKS, NATIONAL, subhead *Parks of Canada.*

JAUNDICE, *jahn'dis,* or *jawn'dis,* or **ICTERUS,** *ik'ter us,* a diseased condition occasioned by some interference with the discharge of the liver secretions. It may be caused by gall stones in the hepatic or cystic ducts, or by inflammation of the bile ducts, preventing a free flow of bile into the intestines. The bile, when not discharged through its natural channel, is absorbed by the blood. Jaundice, which is a symptom of disease rather than a disease itself, is manifested by a yellowish color of the skin and whites of the eyes, weakness, loss of appetite, lassitude, constipation and excessive flow of urine. In some cases nausea and vomiting occur. Purgatives and tonics are usually given, and the diet is carefully selected. A bad case of jaundice may last for two months, and any one suffering from the ailment should be under the care of a physician. See BILE; LIVER. J.H.K.

JAVA, *jah'va,* one of the richest and most populous islands of the world, the most important of the Dutch East Indies. It lies south of the equator, between the Sea of Java and the Indian Ocean, is separated from Sumatra on the west by the Strait of Sunda, and from the island of Bali on the east by the Strait of Bali. The island is long and narrow, its greatest length from northwest to southeast being 660 miles. Including Madura and several small adjacent islands which belong to Java, it has an area of 50,554 square miles, a little more than that of the state of New York and nearly twice that of New Brunswick.

The south coast is steep and rocky, but low swamps overgrown with mango trees and bushes border the northern shores. Java is one of the most volcanic regions in the world, having forty-five volcanoes in height from 2,000 to



LOCATION MAP

12,040 feet. In the western part of the island the volcanoes are most numerous and destructive. In 1686, in the eruption of Ringglut, 10,000 lives were lost, and in 1901, the Kloet, a smaller volcano, destroyed crops and towns 150 to 250 miles distant. The well-known explosive eruption of Krakatoa, in the Strait of Sunda, in 1883, was one of the most disastrous in history.

Java's mountains are fertile almost to their summits. They are overrun by European wild flowers, and on their lower slopes there are fields of corn, tobacco, cabbages and potatoes. The valleys and plains are exceedingly fertile, and are well watered by many rivers. Coffee, tea, sugar, cotton, fruit and spices are extensively raised and exported. The flooded rice fields of the lowlands yield Java's most important crop and the chief food of the natives. In 1912, 6,300,000 acres of rice were under cultivation and one-half of the crop was exported, most of which was sent to Borneo. Teakwood, rubber and sandalwood are other exports of importance. Four-fifths of Java's trade is with Holland; extensive trade is also carried on with Singapore and Penang.

The climate is uniform, the only change occurring in the rainfall during the wet and dry seasons. In the western section there is rain throughout the year, and thunderstorms are violent.

The Inhabitants. Living in this paradise of the tropics are about 30,000,000 natives and 81,000 Europeans; more than two-thirds of the latter are Dutch. The Javanese, representing the highest type of Malayan culture, are a small, yellow-brown people somewhat taller and more comely than their neighbors of Sumatra. All religions are tolerated, and the Dutch Reformed and Roman Catholic churches have many followers, but the natives are chiefly Mohammedan. In 1913 there were about 360 missionaries in Java. In the same year there were 816 government schools with 120,000 pupils, and 490 schools with an enrollment of nearly 31,000.

History and Government. Until the fifteenth century the chief influence in the history of Java was Hindu, and many relics of this period still remain, notable among them being the great temple Bolo Boldor, in Central Java. The island was conquered by the Mohammedans and remained in their power until the coming of the Europeans.

Java first came into touch with Europe when the Dutch East India Company established trading stations along the coasts. Dutch influence was gradually extended over the island, much the same as English control spread over India. From 1811 to 1816 the British controlled Java, but Holland regained the island, which has since been the seat of the Dutch colonial government in the East.

Since 1870 Holland and Java have been mutually benefited through their relations. Private agriculture has greatly increased, and in 1912 Europeans held 1,129,000 acres on lease by the government, and about 8,638,600 acres were under native cultivation.

The island is divided into twenty-three residencies, similar to American counties, under the Governor-General, who is assisted by an advisory council of five, and resident governors. There are several vassal native states. Batavia is the capital city. Java is famous for having one of the world's finest botanical gardens at Biutenzorg. See EAST INDIES, DUTCH. E.B.P.

Consult Wallace's *The Malay Archipelago;* De Wit's *Facts and Fancies about Java;* Knox's *Boy Travelers in the Far East.*

JAY, one of a family of birds containing about 200 species, among them the ravens, crows and magpies. They are found in all parts of the world except New Zealand. The members of the family to which the jay belongs are characterized by common traits of disposition rather than by similarity of appearance. Some are large and some are small; the crows are entirely black, and the magpies are black with bold white markings. The *American,* or *blue, jay,* which is a little larger than the robin, is dressed in a very beautiful gray-blue coat, with markings of black and white. On its head it wears a crest of feathers sloping up from the bill in pompadour fashion. The *Canadian jay,* or *whisky Jack,* is gray without any other color.

AMERICAN BLUE JAY

They are all saucy, jaunty fellows that destroy and eat the eggs in other nests, mimic the notes of other birds, and take great delight in teasing. The jays like to surround a sleepy owl and confuse him with their shrill chatter. They either show some degree of intelligence or are imitative, for they can be taught to pronounce certain words with a good degree of distinctness. Their own note of *jay, jay,* is shrill and unmusical. They build their nests from ten to twenty feet above the ground. These are compact and snug, made of twigs and lined with feathers and bits of thread and wool. In March or early April they raise their families of from four to six. The eggs are pale olive-green, or ashy-brown with light or dark brown spots.

The jays do not migrate except from the extreme northern limits of their range.

JAY, JOHN (1745-1829), an American jurist and statesman who rendered distinguished service to his country in the early period of its history. He was associated with John Adams and Benjamin Franklin in the negotiation of the peace treaty with Great Britain at the close of the Revolutionary War; he aided Alexander Hamilton in his efforts to secure the ratification of the Constitution by writing some of the papers collected in the *Federalist* (see FEDERALIST, THE); and the most important

treaty of Washington's second term, which bears his name, was negotiated by him (see JAY TREATY).

John Jay was born in New York City. In 1764 he was graduated from King's College (now Columbia University), and after a course in law was admitted to the bar in 1768. He represented New York in the First Continental Congress, which assembled in 1774 at Philadelphia, was chosen a delegate to the Second Congress, and would have been one of the signers of the Declaration of Independence had he not been called away in May, 1776, to take his seat in the Provincial Congress of New York. In 1778 he returned to Congress, serving as president of that body from December, 1778, to September, 1779. In the latter year he was appointed minister to Spain, and while abroad took part in the negotiation of the peace treaty with Great Britain.

JOHN JAY

In reviewing the life of Jay, Daniel Webster once said: "When the spotless ermine of the judicial robe fell on John Jay it touched nothing less spotless than itself."

From 1784 until the organization of the government under the Constitution Jay was Secretary for Foreign Affairs, and he was appointed by President Washington first Chief Justice of the United States Supreme Court. In 1795 he resigned this exalted post to become governor of New York, an office which he held for two terms. At the end of his second term, in 1801, he retired to private life.

Consult Whitelock's *Life and Times of John Jay;* Pellew's *John Jay*, in American Statesmen Series.

JAY TREATY, in American history, the first treaty negotiated between Great Britain and the United States after the signing of the peace of 1783, which concluded the Revolutionary War (see PARIS, TREATIES OF). It was named for Chief Justice John Jay, who acted for the United States in the negotiation proceedings, and was signed by him and the British representative, Lord Grenville, in London, on November 19, 1794. After the Treaty of Paris trouble arose between the two countries over the treatment accorded the Tories (British sympathizers) who had remained in America. Among these were British merchants who were unable to collect old debts, though such payment was promised in the peace articles. In retaliation, Great Britain continued its garrisons in various forts on the northwestern frontier, and caused the Americans further annoyance by refusing to pay for negroes carried away by the English troops at the end of the war. An even greater cause for ill-feeling was England's insistence on the right to search American vessels for supposed deserters from the British navy and to capture merchant vessels carrying provisions to France.

To avert another war, for which the new American nation was ill prepared, President Washington nominated Chief Justice Jay as a special ambassador to negotiate a treaty adjusting the various points at issue. The publication of the resulting agreement caused intense indignation in America. Nothing whatever was said about the right of search or impressment, or compensation for kidnaped negroes, and the evacuation of forts on the frontier was the only real concession to which England agreed. The United States agreed to pay all debts due British merchants at the outbreak of the Revolution, and to submit to a joint commission a dispute over the northeast and northwest boundaries. Though Jay was burned in effigy in numerous places, and President Washington was subjected to bitterest censure for acceptance of so unfavorable a treaty, in time the people came to realize that circumstances justified the action.

JEFFERSON, JOSEPH (1829-1905), one of America's greatest actors, who was affectionately called "the dean of the American stage." He was born in Philadelphia, the third child of a family of actors; his great-grandfather had been a member of Garrick's company at Drury Lane, London. Jefferson said of himself, "I may almost say I was born in the theater," as at the age of three he appeared in a juvenile part in *Pizarro.* His first pronounced success was in *Our American Cousin* in New York, a play which developed unexpected powers in him. He also became a notable "Caleb Plummer" in Dickens' *Cricket on the Hearth.* His greatest success however, was as the kindly, harmless vagabond "Rip," in *Rip Van Winkle,* and with this character his name is mainly associated. He presented this play every season for forty years. In 1868 he created another famous rôle for himself as "Bob Acres" in *The Rivals,* and only a

short time before his death he charmed playgoers by a masterly presentation in the title rôle in *A Poor Relation*. No other man in his profession was more honored, but he was never fully contented, for he had longed to become a great painter; and devoted as he was to his art, he felt that the other art was higher.

JEFFERSON, THOMAS (1743-1826), an American patriot, diplomat and statesman, principal author of the Declaration of Independence and the third President of the United States. Shortly before his death Jefferson wrote the following inscription to be placed over his grave:

"Here was buried Thomas Jefferson, author of the Declaration of Independence, of the Statute of Virginia for Religious Freedom, and Father of the University of Virginia."

This epitaph, he felt, expressed his claims to fame. The judgment of posterity has added a fourth claim, the purchase of Louisiana Territory from France.

His deeds may justify his fame, but they do not explain the veneration in which his name is yet held, and was held even in his lifetime, by the people of the United States. It has been said, and said truly, that most of Alexander Hamilton's views are reflected in the form of the American government, but that Jefferson's spirit has given them life. Jefferson took from the crumbling governments of the colonies and from the French Revolution the lesson that governments derive their strength from the consent of the governed. His system of political philosophy was based on individualism, which led to liberty in politics as in religion. His ideas were in line with American tendencies. The educated men of the colonies, the men who became the leaders of the new nation, were aristocrats, and with scarcely an exception they demanded a strong, centralized government and distrusted the people, most of whom were, indeed, uneducated. Almost alone of the leaders who helped to establish the government of the United States, Jefferson had a deep and unfaltering trust in the people, and the people in turn have made him the idol of American democracy.

Thomas Jefferson was born at Shadwell, Albemarle County, Va., on April 2, 1743. His father, Peter Jefferson, was a man of prominence in the community, and at various times was county surveyor, justice of the peace, and member of the Virginia House of Burgesses. Though Peter Jefferson owned slaves and an estate of nearly 2,000 acres, he did not belong to the Virginia aristocracy. His family had been well known in Western Virginia for over a hundred years, but had never tried to live in the easy, luxurious style of the great planters. In politics Peter Jefferson was a Whig, and in society he was thoroughly democratic. This liberal democrat married Jane Randolph, a member of one of Virginia's aristocratic families, and their eldest son was Thomas Jefferson.

The boy Thomas grew up strong and healthy, with a fondness for hunting and other outdoor sports, and to the end of his life thoroughbred horses were apparently necessary to his happiness. At the same time he inherited from his father an inclination for politics, literature and mathematics. He sang and danced well, and even as a boy became an excellent violinist. In spite of all these interests he did not neglect his studies. At seventeen he entered the College of William and Mary, then the foremost institution in the South; and at twenty, when he was graduated, he carried away a working knowledge of Latin, Greek and French and a familiarity with natural science and mathematics which was extraordinary for one so young. After he left college he added Spanish, Italian and Anglo-Saxon to his accomplishments, and

throughout his life he remained an eager seeker for knowledge.

Soon after leaving college Jefferson entered the law office of George Wythe, then the leader of the Virginia bar, and in 1767 was admitted to practice. He had received a thorough grounding in the principles of the law, but never took great interest in practicing it. In addressing judges and juries he was handicapped by a weak voice, which became husky after he had spoken only a short time. It seems, moreover, that he was disgusted with the current tendency to carry every little dispute to the courts, yet his conscientious, painstaking services brought him a large practice.

In the meantime, while still studying law, Jefferson had assumed the management of the estate left by the death of his father in 1757. He was chosen to the office of justice of the peace, which his father and his father's father had held before him, and also, like his father, was elected to the House of Burgesses. This was in 1769, and marks his entrance into political life. Yet his political activity was rather that of the country gentleman, who naturally held political office as an incidental obligation due to his social prominence. He was constantly adding to his estate, until in 1772, when he married, he owned 5,000 acres, free of debt. His bride, Mrs. Martha (Wayles) Skelton, was a charming widow of twenty-three, artistic and fond of music. Jefferson was not the only suitor for the widow's hand. The story goes that one day two of his rivals met in the hallway of Mrs. Skelton's home. They were about to enter the drawing-room when music was heard. Jefferson and Mrs. Skelton were singing a duet, while Jefferson also played the violin and the lady accompanied him on the harpsichord. The two would-be suitors halted, looked at each other, and then, without speaking a word, tiptoed out of the house.

THOMAS JEFFERSON
Jefferson and John Adams died on the same day (July 4, 1826), the last great figures of the nation's first generation of statesmen.

Whether the above story is true or not, it is certain that Jefferson and his wife were devoted to each other, and lived happily at Monticello, the home which Jefferson built after his father's house at Albemarle burned to the ground. He was very busy laying out gardens, trying to cultivate new plants introduced from foreign lands, and generally trying to make his new home attractive. Farming, landscape gardening and architecture were at that time his hobbies.

The Shadow of Revolution. Since 1769 he had been continuously a member of the House of Burgesses, and had been a leader in the attempts to maintain the rights of the colonists. In 1774 he was elected to the Virginia convention to consider the state of the colony. Illness kept him away, but he sent to the convention a series of resolutions which he wanted adopted as instructions for the delegates to the Continental Congress. The substance of these resolutions was that "emigration to this country [that is, America] gave England no more rights over us than the emigration of the Danes and Saxons gave to the present authorities of their mother country over England."

Declaration of Independence. This was radical doctrine, far too radical for the Virginia convention, but it made Jefferson famous throughout the colonies, and resulted in his appointment as a delegate to the Continental Congress. On the tenth of June, 1776, he was appointed chairman of a committee of Congress to draft a declaration of independence. As chairman, Jefferson naturally wrote the document, and with the exception of one or two phrases suggested by Franklin and John Adams, the Declaration reported by the committee was entirely the work of Jefferson. Congress debated it for three days, during which a number of changes, chiefly omissions, were agreed on, but the Declaration of Independence, as it was finally adopted, still remained substantially as Jefferson had written it (see DECLARATION OF INDEPENDENCE).

Services to the State of Virginia. Shortly after the Declaration of Independence was adopted, Jefferson withdrew from Congress, and in October, 1776, again took his seat in the Virginia legislature. He felt that the laws of Virginia needed revision, and particularly that four proposed laws would form a foundation "for a government truly republican." These four measures were the repeal of the laws of entail; the abolition of primogeniture (which see); freedom of conscience and relief from supporting, by general taxation, an established church; and a system of general education. District, grammar and classical schools, a free state library and a state college were a part of Jefferson's plan, but these were generations ahead of the times. Yet to Jefferson must be given great credit, for he was the first American statesman "to make education by the state a fundamental article of Democratic faith." The other three measures were passed, not at once and not through Jefferson's influence alone, but he inspired other men to work for the same causes. In 1778 he introduced and secured the passage of an act to prohibit the importation of negro slaves into Virginia, and he labored to secure a revision of the penal laws. From 1778 to 1796 he and his friends, among them James Madison, worked for the restriction of capital punishment, and finally succeeded in eliminating the death penalty for all offenses except murder and treason.

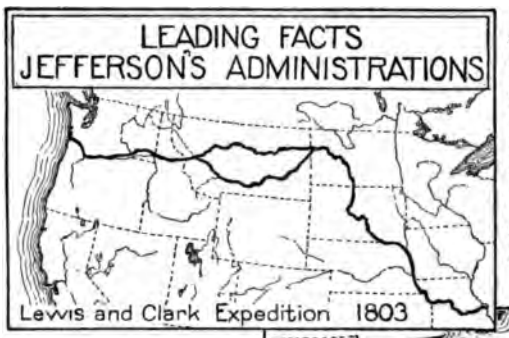
In 1779, when the outlook for the colonies seemed darkest, Jefferson succeeded Patrick Henry as governor of Virginia. His first term, 1779-1780, was uneventful, but during his second term the state was overrun by British troops, and Jefferson himself narrowly escaped capture at their hands. His failure to defend the state against invasion was severely criticized by some persons, but he was powerless, for the state had already sent all available men and supplies to the army under Washington, and there was no means of defense. Jefferson was perhaps not fitted to be a governor in time of war, but his course had Washington's approval. At the expiration of his term he again became a member of the legislature, which answered his critics by giving him a vote of thanks and confidence for his services as governor.

Called to Serve the Nation. Less than a year later (in September, 1782), Jefferson's wife died, leaving to his care three daughters, the youngest only four months old. He had long since wished to retire from public life, and now determined to do so. He declined to go to France as peace commissioner, but when he was urged a second time, finally accepted, only to learn that the preliminary treaty had already been signed. In 1783 and 1784 he was again in Congress, where he was instrumental in securing the adoption of the decimal system of currency. In 1781, while Jefferson was governor, Virginia offered to cede to Congress its claims to the western territory, and in Congress in 1784 he made the first draft of the ordinances for the government of this

MONTICELLO
The home of Jefferson.

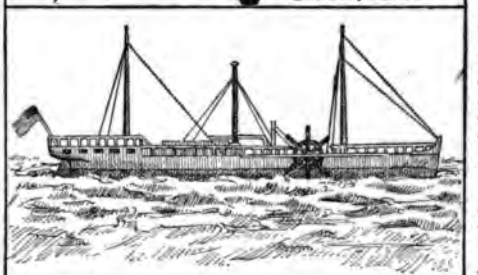
region. His plan, which applied to the lands south as well as north of the Ohio River, provided for the abolition of slavery in 1800. It was defeated in Congress, but was the basis of the Ordinance of 1787 which made the Northwest free territory. Jefferson was himself a slave-owner, but he believed that justice and patriotism demanded the abolition of the system (see ORDINANCE OF 1787).

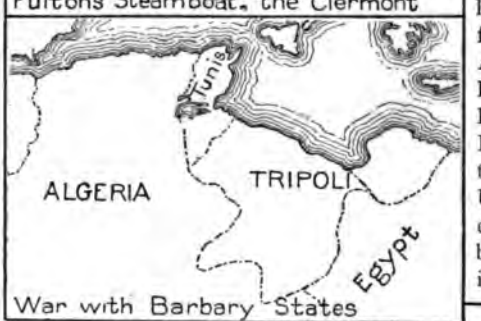
American Representative in France. In May, 1784, Jefferson was sent to Europe to assist Benjamin Franklin and John Adams in negotiating commercial treaties, and in the next year was appointed minister to France. Measured by the diplomatic results his stay in France was not important, because Europe in general and France in particular had internal troubles and were not interested in the United States. But his personal charm, his culture, his simplicity, his sympathy with French ideals, impressed all with whom he came into contact and did much to set the United States in a more favorable light among Europeans. He was greatly interested in the French Revolution and the events leading to it, and it is not unfair to say that his political philosophy always showed the influence of the five years he spent in France. His personal



popularity in France may be judged from the fact that in July, 1789, while he was still accredited as minister to the French king, he was invited by the national assembly to assist in drafting a new French constitution.

Secretary of State and Vice-President. In the late autumn of 1789 Jefferson was granted a six-months' leave of absence and sailed for home. He planned to return to France at the end of that time, but with great reluctance finally accepted the position of Secretary of State, at President Washington's urgent request. He was the first to hold this Cabinet position. His tenure of the office was not a happy one, for he had no sooner entered on his duties than he became the open leader of the Democratic-Republicans, who believed in state sovereignty and trusted the people. Alexander Hamilton, the leader of the Federalists, was also in the Cabinet as Secretary of the Treasury, and used his great influence in favor of a strong, centralized government. Jefferson, in short, admired French republican models; Hamilton, British monarchical models. The two men were personally and politically antagonistic, and it was with great joy that Jefferson induced Washington to accept his resignation.





A few months later, when Hamilton, too, resigned, Washington again offered Jefferson the post of Secretary of State, but the latter declined it. He was determined more than ever, he said, to devote the remainder of his life to farming. Nevertheless, in 1796 he allowed his name to be used as a candidate for the Presidency to succeed Washington, and escaped election by the narrow margin of three votes. John Adams received seventy-one electoral votes to sixty-eight for Jefferson, who, under the Constitution as it then existed, became Vice-President. Adams and Jefferson were of opposite parties, and throughout his term the President steadily disregarded the Vice-President. Jefferson had no share in fixing the government's policy; in fact, he remained the leader of the opposition party, and wrote the Kentucky Resolutions, the most vigorous statement of its views.

Election of 1800. The Presidential election of 1800 was bitterly contested. There were four leading candidates, Jefferson, Aaron Burr, John Adams and Charles C. Pinckney; Jefferson and Burr were Democratic-Republicans; the other two were Federalists. Under the Constitution each elector cast two ballots without designating which was for Presi-

OUTLINE AND QUESTIONS ON THOMAS JEFFERSON

Outline

I. Years of Preparation

(1) Birth and parentage
(2) Education
(3) Early public activities
  (a) In the Virginia House of Burgesses
  (b) Chosen delegate to the Continental Congress

II. Early Years of Leadership

(1) The Declaration of Independence
(2) In Virginia legislature
  (a) Important revision of state laws
(3) As governor of Virginia
(4) In Congress
  (a) The Northwest Territory question
(5) As minister to France
(6) As Secretary of State
  (a) Clash with Hamilton
(7) As Vice-President with John Adams

III. His Administrations

(1) Election of 1800
  (a) Candidates
  (b) Issues
  (c) Contested outcome
    1. Jefferson chosen by House
(2) Strict construction in practice
  (a) Navy put out of commission
  (b) Other items
(3) War with Barbary States
(4) Louisiana Purchase
  (a) Lewis and Clark Expedition
(5) Relations with France and Great Britain
  (a) Continental System and Orders in Council
  (b) Chesapeake Affair
  (c) Embargo Act
  (d) Non-intercourse Act
(6) Twelfth Amendment
(7) Abolition of slave trade
(8) Internal affairs
  (a) Ohio admitted
  (b) West Point established
  (c) Fulton's steamboat
  (d) Cumberland Road
  (e) Duel between Burr and Hamilton
  (f) Burr's conspiracies

IV. Last Years

(1) The "Sage of Monticello"
(2) Financial affairs
(3) The University of Virginia founded
(4) Death and character

Questions

What lesson did Jefferson draw from the French Revolution? How did he put it into practice?

How did one of Jefferson's chief political adversaries help to elect him to a high office?

What did Jefferson wish to have carved on his tombstone?

On what theory did Jefferson base his belief that the colonies had a right to be free, and what illustration did he draw from early English history?

What shows the advanced character of his ideas on education?

In what way was Jefferson related to the "first families" of Virginia?

How may it be said that many wrong-doers in Virginia owed their lives to Jefferson?

How did the youth of Jefferson differ from that of Grant, Garfield, Jackson and others of the Presidents?

Why did his adversaries feel that he was acting contrary to his principles in purchasing the Louisiana Territory?

Why could Jefferson never become a very effective public speaker?

What part did Jefferson's love of music play in the romance of his life?

What famous man was killed during Jefferson's administration by another of almost equal fame?

dent and which for Vice-President, and the result gave Jefferson and Burr each seventy-three votes, Adams sixty-five and Pinckney sixty-four. The election was thus thrown into the House of Representatives, which was controlled by a Federalist majority. A few Federalists, willing to go any lengths to defeat Jefferson, allied themselves with Burr, after a series of intrigues, but Hamilton, still the leader of the Federalists, threw his influence to Jefferson, who was finally elected by the vote of ten states to four for Burr. The members of the House voted by states, not as individuals. This contest, which threatened to disrupt the government, resulted in an amendment to the Constitution, adopted in 1804, by which electors are required to name their choice for President and Vice-President respectively, and by which the House is allowed, in case no candidate has a majority, to choose from the three candidates receiving the most votes, instead of two candidates as before.

Administrations of Thomas Jefferson, 1801-1809. Jefferson served two terms; he was reëlected in 1804 by an electoral vote of 162 out of 176 votes cast. When Jefferson entered office he held extreme theories of strict construction of the Constitution, and he set about putting them into effect. The navy, created during the preceding administration, he cut down by putting out of commission all but six ships. He secured a reduction in the appropriations for the army and the diplomatic service, and in every way tried to lessen the expenses and the functions of the government. He also took steps, in 1802, to end the collection of internal revenue, and in 1803 secured from Congress the repeal of the national bankruptcy law, which had been passed in 1800.

A vigorous assertion of national feeling, however, was the course he followed in relation to the piratical Barbary States. Nearly twenty years earlier, while minister to France, he had urged the United States government to refuse further tribute to the pirates. In 1801 Tripoli, one of these Barbary States, demanded an increased annual payment, which was refused. Tripoli thereupon declared war, and Jefferson responded by sending an American squadron into the Mediterranean Sea. Tripoli's ports were blockaded and bombarded, and in June, 1805, Tripoli asked for peace. The United States was thus the first nation in the world to gain immunity from tribute and piracy in the Mediterranean (see BARBARY STATES).

The crowning achievement of Jefferson's first administration, however, was the Louisiana Purchase (which see). Jefferson himself doubted the constitutionality of the act, and he was taunted by his opponents for abandoning his principles of strict construction. Yet the purchase was also proof of Jefferson's farsightedness, of his practical statesmanship, of his willingness to subordinate personal views to whatever seemed, in the last analysis, for the common good.

Reëlected in 1804 by an overwhelming majority, Jefferson's second term began auspiciously. The nation was prosperous, commerce was flourishing, and American ships carried much of the trade of Europe. Unfortunately the war between England and France (the Napoleonic wars) had broken out again in 1803, and the United States was destined to suffer at the hands of both belligerents. Jefferson endeavored to secure for the United States and other neutrals certain rights which belligerents acknowledged in theory but refused to concede in practice. Great Britain, as the first step, declared a blockade of the European coast from Brest to the Elbe River. To this Napoleon replied by declaring a blockade of the British Isles (see CONTINENTAL SYSTEM; ORDERS IN COUNCIL). Great Britain, moreover, made a practice of stopping and searching American merchantmen for contraband and for British citizens, a practice which came to a climax in the "Chesapeake Affair." Henceforth British vessels were forbidden to enter American harbors, and in December, 1807, Congress passed the Embargo Act (see EMBARGO). The Embargo, however, did France and Great Britain little damage, whereas it practically ruined American commerce and nearly alienated the New England states. It was evaded by many shippers in the United States, and was finally replaced by the Non-Intercourse Act (which see) in 1809. Jefferson always believed that the Embargo was justified and that it would have attained its object if the nation as a whole had been willing to make the sacrifices demanded.

During Jefferson's eight years in office many other noteworthy events took place, with some of which he was not personally concerned. Ohio was admitted as a state in 1802, and the United States Military Academy at West Point was founded in the same year. Robert Fulton's first successful steamship, the *Clermont*, was completed in 1806, at the same time that the Cumberland Road (which see), the first

of the national highways, was begun. In 1807 Congress voted to abolish the slave trade, and the act went into effect on January 1, 1808. One of the first results of the Louisiana Purchase was the Lewis and Clark Expedition (which see); it not only secured much valuable information about the land purchased from France but strengthened the claim of the United States to the great Oregon country. The purchase of Louisiana Territory, on the other hand, had one unfortunate result—the various attempts of Aaron Burr to set up a new government in the West. Burr had killed Alexander Hamilton in a duel in 1804, and was, in consequence, far from popular, especially in the East. In the West, however, he found new friends, men who were willing to support the more or less treasonable schemes which are explained elsewhere in these volumes (see BURR, AARON).

The "Sage of Monticello." Following the example of Washington, Jefferson refused to be a candidate for a third term, and on March 4, 1809, laid aside the cares of office. He continued his interest in political affairs, however, and was constantly consulted by Presidents Madison and Monroe, whose policies he approved. As was often said, they were "three men and one system." Not only Madison and Monroe, but hundreds of others consulted him. Visitors came to Monticello from all parts of the United States and even from Europe, to seek his advice, to bring him gifts, or merely to pay their respects. On many occasions his housekeeper had to provide sleeping accommodations for as many as fifty guests. Living with Jefferson were his daughter, Martha, her husband, and their eleven children, and also the son of his deceased daughter Mary. Surrounded by grandchildren and honored by all, he lived the life of a patriarch. But his finances, seriously embarrassed by the War of 1812 and by hard times, could not stand the strain of his open-handed hospitality, and in the closing years of his life he was practically a bankrupt. Contributions from friends and the public kept his last days from poverty and deeply touched his heart.

The last great work of his life was the establishment of the University of Virginia. For forty years he dreamed of this institution, which was to crown the school system of the state, and he finally secured an appropriation for it from the legislature. He drew the plans for the buildings, and personally superintended their construction. He engaged the laborers, bought the bricks and selected the very trees to be used for timber. He mapped out the courses of study and engaged the faculty. The university opened in March, 1825, with forty students, but Jefferson lived to see this number increase in the next year to 177. It is a high tribute to him that in its educational aims, in administration and in its curriculum it anticipated the typical American university of the twentieth century. The university was a fitting capstone to the life which came to an end on July 4, 1826, just fifty years after the adoption of the document which first made Jefferson's name a household word in the new American nation. John Adams, his old rival, died a little later, on the same day. W.F.Z.

Consult Merwin's *Thomas Jefferson;* Watson's *Life and Times of Thomas Jefferson;* Dodd's *Statesmen of the Old South;* Schouler's *Thomas Jefferson,* in Makers of America Series.

JEFFERSON CITY, Mo., the capital of the state and county seat of Cole County, situated near the geographical center of the state, on the Missouri River. Saint Louis is 125 miles east, and Kansas City is 160 miles northwest. The Missouri Pacific, the Missouri, Kansas & Texas and the Chicago & Alton railways serve the city. Germans predominate in the foreign element of its population, which increased from 11,850 in 1910 to 13,484 in 1916. The area is about four square miles.

The site of Jefferson City is partly on the bank of the river and partly on an elevation which affords a fine view of the river and surrounding country; upon this stands the state capitol, an imposing structure. Other notable buildings are the Federal building, erected at a cost of $150,000, the state penitentiary, which cost $600,000, the $400,000 Supreme Court building, the state armory, governor's mansion, courthouse, Carnegie Library and Lincoln Institute. The latter is for negroes, and was founded in 1866 by colored infantry upon their discharge from the United States Army; the Institute was taken over by the state in 1879.

The penitentiary is partly self-supporting, employment being furnished on the premises to the convicts by incorporated companies. The state law library is one of the best in the United States. Aside from its interest as a state capital, the city has natural advantages as the center of a rich agricultural and mineral region; its manufactures are varied and extensive—clothing, flour, boots, shoes, saddletrees, agricultural implements, foundry products and bricks being the most important

Here are also located the machine shops and roundhouses of the Missouri Pacific Railway. About 1,000 people are employed in the shoe factories and about 200 in an overall factory.

Legally and officially, the city is known as *The City of Jefferson.* It was founded in 1822, and named for Thomas Jefferson. The first legislature met here in 1826; it became the county seat in 1828, and a city charter was granted in 1839. E.S.A.

JEFFERSONVILLE, IND., the county seat of Clark County, situated in the southeastern part of the state, 108 miles south of Indianapolis, and on the Ohio River opposite the city of Louisville, Ky., with which it is connected by several bridges. It is on the Pittsburgh, Cincinnati, Chicago & Saint Louis, the Louisville & Northern, the Baltimore & Ohio Southwestern, and the Cleveland, Cincinnati, Chicago & Saint Louis railroads; it is also served by interurban electric lines. In 1910 the population was 10,412, and it was practically the same in 1917.

The elevated position of Jeffersonville, on bluffs along the river, affords its residents fine views of Louisville and the surrounding country. In the town are a United States quartermaster's supply depot, the Indiana Reformatory, the city and state reformatory libraries and an orphans' home. Jeffersonville ships quantities of strawberries, and has important manufactories of river steamboats, freight and passenger cars and foundry and machine-shop products.

The United States government established Fort Tinney here in 1786, but it was abandoned in 1791. A later settlement was incorporated in 1815 and became a city in 1839.

JEFFREYS, *jef'riz,* GEORGE, LORD (1648-1689), a judge of ill repute, who was called to the bar in England in 1668 and became a willing tool of the Crown; was rewarded by special favors from James, the heir to the throne, and knighted soon after the latter became king as James II. Lord Jeffreys took an active part in the Popish Plot prosecutions and was made Chief Justice of Chester and king's sergeant in 1680; he was made a baronet in 1681, and Chief Justice of the King's Bench in 1683. As Jeffreys made his way through Dorset and Somerset during the "Bloody Assize" he caused 320 rebels to be hanged, sentenced 840 to be transported, and a greater number to be imprisoned and whipped. After the downfall of James, Jeffreys attempted to escape, disguised as a sailor, but was caught and sent to the Tower of London, where he died four months later.

JEHOSHAPHAT, *je hosh'a fat,* one of the best kings of Judah, whose prosperous reign was blessed with riches and honor by the favor of God, whom he worshiped. For five years before the death of his pious father, Asa, he appears to have been associated with the government, so his reign extended over twenty-five years. Soon after Jehoshaphat became sole ruler of his country he appointed a commission to instruct the people of Judah concerning God. The nation reached such a high degree of piety that "the fear of the Lord fell upon all the kingdoms of the lands that were round about Judah" (*II Chronicles* XVII, 10). This was the climax of their prosperity, for even the Philistines and Arabians, instead of making war, brought presents and tribute money to Jehoshaphat. His reign, which ended in 850 B. C., when he was sixty years old, stands out in marked contrast to the succeeding reigns, characterized as they were by idolatry, moral degradation and political disaster. However, he sowed the seed of future evil when he married his son Jehoram, who was the successor to the throne, to the daughter of Ahab, the idolatrous king of Israel.

JEHO'VAH, in the Old Testament the sacred name for God among the Hebrews, especially during the period of the prophets. At the time of the patriarchs the name was known, and it was revealed anew to Moses, but it was not until the great awakening of the prophetic spirit under Samuel that the true meaning of *Redeemer* became attached to it. The name *Elohim* was frequently used by the psalmists, but *Jehovah* had the deeper significance, and was regarded with great awe by many, who avoided pronouncing the word by using instead the term *Adonai,* meaning *the Lord.* See GOD.

JE'HU, the founder of the fourth dynasty of rulers in the kingdom of Israel, who ascended the throne in 842 B. C., after a wholesale massacre of the family of the idolatrous king Ahab. Although a son of Jehoshaphat, the king of Judah, he entered the service of Ahab as a soldier and served for twelve years, when Elisha, the great prophet of God, sent a messenger to anoint him king of Israel. To obtain the throne, Jehu led the soldiers whom he commanded against Jehoram, Ahab's son-in-law, then ruler. After killing him he ordered all the seventy sons of Ahab put to death and lured the priests of Baal into a heathen temple, where they were massacred. Soon after as-

cending the throne, he purchased the favor of Shalmaneser, king of Assyria, by rich gifts, and this event was recorded on the black obelisk which is now in the British Museum. However, the twenty-eight years of his reign were not very prosperous. The nation weakened considerably, but God promised him that four generations of his family should rule in Israel.

The modern expression, "to drive like Jehu," which means to drive rapidly, arose from the Biblical description of Jehu's approach to the city when he attacked Jehoram. The watchman on the tower saw him coming and said, "The driving is like the driving of Jehu the son of Nimshi; for he driveth furiously" (*II Kings* IX, 20).

JELLICOE, *jel'i ko,* SIR JOHN RUSHWORTH (1859-), a vice-admiral in the British navy and commander-in-chief of the Home Fleet since 1914, was educated at Rottingdean and entered the navy at the age of thirteen. He served in 1882 in the Egyptian War, where he won a medal. Soon after he obtained three certificates for lieutenant, and the next year he won a prize of about $400 at the Royal Naval College. He served in China from 1898 to 1901, and was chief of staff to Vice-Admiral Seymour during the attempted relief of Peking in the Boxer rising. The Order of the Red Eagle was conferred upon him by the Emperor of Germany for his work in China. He was made rear-admiral in 1907 and given a command with the Home Fleet, of which he became commander-in-chief in 1914. He was commander of the British fleet in the Battle of Jutland, May 3, 1916. See WAR OF THE NATIONS.

JELLY, *jel'i,* the name applied to any semi-solid, tremulous vegetable or animal substance which liquifies when exposed to heat. A vegetable jelly is made by boiling the juices of fruit with sugar, in the proportion usually of one part of sugar to one part of juice. Investigations have determined that unripe fruits contain a compound of carbon, hydrogen and oxygen, called pectose. As the fruit ripens, this substance is changed into *pectin* by the action of a ferment in the fruit called *pectase.* The juice of ripe fruits contains a large quantity of this substance, which on being heated to a temperature of 105° F. is converted into one or more substances whose character has not been completely determined, but which gelatinize, or jelly, when cooled. Jellies which have been boiled for the proper length of time (varying according to the quantity and kind of fruit juice) and which are carefully sealed so as rigidly to exclude air, will keep for an indefinite period (see FOOD PRODUCTS, PRESERVATION OF).

Animal jelly is a colorless, transparent, elastic substance which is rapidly soluble in hot water. It is produced by boiling with water the muscles, cartilage and skins of animals. Bones, when finely crushed and subjected to the combined actions of high-pressure steam and water, yield a strong jelly.

JEL'LYFISH, the name commonly applied to several species of free-swimming marine animals because of their transparent, jellylike appearance. They have a saucer-shaped body, termed the *umbrella,* on the under side of which is the mouth. When cast up on the beach their general structural characteristics have been destroyed, and their bodies are literally jellylike masses. They are most numerous in tropical seas, and among them are specimens of great beauty. A species is sometimes found on the coast of New England and in the North Atlantic; it is called the blue jellyfish, is nearly two feet in diameter and has long, stringlike tentacles filled with stinging hairs which are poisonous and especially irritating to bathers and fishermen.

JENA, *ya'nah,* a town in the grand duchy of Saxe-Weimar-Eisenach, Germany, of educational and historic fame, situated ten miles southeast of Weimar. It is the seat of the celebrated Jena University, which has acquired distinction in recent times through its departments of biology, philosophy and theology, and which, through its school of practice, has exercised great influence on education in England and America. The university library contains 270,000 volumes. The town also contains the famous Zeiss Optical Works, its chief manufactory. Population, 1910, 38,480.

Battle of Jena. Near the town of Jena, on October 14, 1806, was fought one of the great battles of the Napoleonic wars, in which about 65,000 Prussians, under Prince Hohenlohe, were defeated by a French army of 100,000.

JENKS, JEREMIAH WHIPPLE (1856-), an American economist and educator, whose views on national life, formed in his work as government expert on various commissions, are well described in recent books, *The Immigration Problem* and *The Making of a Nation.* He was born at Saint Clair, Mich. After graduating from the state university and receiving his doctor's degree at the University of Halle in

1885, he studied law and was admitted to the bar. After teaching at several colleges and universities, the most important being Cornell, where, for twenty-one years he held the chair of political economy and social science, he was appointed professor of government and director of the division of public affairs in New York University in 1912. For a time he was consulting expert on trusts for the Department of Labor, and he has made several trips to Egypt, India, China and Mexico in connection with currency reform.

JENNER, *jen'er,* EDWARD (1749-1823), an English physician, famous as the discoverer of vaccination as a preventive of smallpox and for his diagnosis of diseases of the heart. He was born at Berkeley in Gloucestershire, studied medicine at Saint George's Hospital, London, and afterwards practiced as a country surgeon in Berkeley. His investigation of cowpox in 1776 was suggested by the local tradition that dairy maids who contracted the disease were immune from smallpox. To aid in his research, Doctor Jenner's son was inoculated with swinepox and proved to be immune from the more serious disease. The theory of vaccination was at first bitterly attacked by physicians and clergymen, but gradually gained ground until about the year 1800 the practice was universally adopted in England, and soon spread to other countries. Doctor Jenner received many honors and rewards, and in 1802 and 1807 Parliamentary grants were made to him aggregating £30,000. See VACCINATION.

JERBOA, *jer bo'a,* a small rodent, closely related to rats and mice and remarkable for its kangaroolike traits. Its fore limbs, which are

THE JERBOA

very small and have five toes, are more used as hands than as feet, while the hind legs are exceedingly long and strong and have three toes. Jerboas inhabit the sandy deserts and grassy plains of Asia, Eastern Europe and North Africa. They are burrowing, night-roaming (nocturnal) animals; they feed upon roots, seeds and birds' eggs, and in large numbers are a menace to grain crops. They hibernate in the colder regions, but do not lay up food for the winter (see HIBERNATION). When menaced, they flee from danger in enormous leaps; otherwise they walk upright, and do not hop like a kangaroo. The best known is the Egyptian species; other allied groups include the great Siberian jumping rabbit and the American jumping, or deer, mouse.

JEREMIAH, *jer e mi'ah,* a Hebrew prophet during the darkest period of the kingdom of Judah, whose warnings and utterances were disregarded, except by those who subjected him to all sorts of persecution because of them. He was the son of Hilkiah, a priest in Anathoth, a village close to Jerusalem, and was quite young when called to prophesy in 626 B. C., the thirteenth year of Josiah's reign. For forty-one years, during the troubled times of Babylonian invasions, he endeavored to root out evil and warn his people against destruction, but the rulers regarded his sayings as bad omens. He saw Jerusalem besieged, his fellow citizens carried away as captives and the city a heap of ruins. At the time of the capture, Jeremiah was in prison, but Nebuchadnezzar, the Babylonian conqueror, released him and in a cave near by he wrote the *Lamentations* (which see). During the rule of Gedaliah, whom Nebuchadnezzar had made governor of Judah, Jeremiah was safe in Jerusalem, but after Gedaliah was murdered a remnant of the Jews fled to Egypt in spite of God's command, "Go ye not into Egypt" (*Jeremiah* XLII, 19), and forced him to go with them. There he delivered his last prophecies concerning the conquest of Egypt by the Babylonians. The time and place of his death are unknown, although tradition says that he was stoned to death by his countrymen, who were incensed at his rebukes.

Book of Jeremiah. This book of the Old Testament, written by Jeremiah near the close of his ministry, is arranged not in the order of events but according to subjects. After the introduction there are three prophetic sections: first, a prediction of the approaching judgment upon Judah and the promise of restoration from exile; second, a history of the destruction of the nation; and third, predictions concerning foreign nations. He foretold the exact date of the Captivity, the fate of Zedekiah, the return of the Jews and the future decay of Babylon. The last chapter seems

to be an historical addition made by some later writer, possibly Ezra, and serves as an introduction to *Lamentations,* which follows.

JERICHO, *jer'i ko,* an ancient city of Palestine, whose strongly-fortified walls fell at the shout of the Israelites, after they had marched around the city for seven days by divine direction, under the leadership of Joshua (*Joshua* VI, 20). Because of the amount of spoils recorded, the city was long reported to be very rich, and accounts of recent excavations prove this supposition to be true. Although much of the city was destroyed by the Israelites, it was later rebuilt. When Hiel of Bethel tried to fortify it during Ahab's reign, Joshua's curse, that anyone who tried to put up defenses would lose his eldest and youngest son, descended upon him. After it had been plundered by the Romans, Herod the Great rebuilt and beautified the city, erecting a royal palace on the hill behind the city, but to-day all that remains is a small village named Er-Riha.

JERICHO ROSE, a small Arabian plant of the mustard family. After flowering, the leaves fall off and the branches curve in toward the center, giving the plant almost a spherical appearance. In this form it detaches itself from its roots, rolls around and is often blown by the wind into water. When moist the branches expand, and the pores open and release the seeds. If taken up before it is quite dry, the plant will retain for some time its characteristic of contracting in dryness and expanding and growing greenish in moisture.

JERICHO ROSE

JEROBOAM, *jer o bo'am,* the name of two kings who ruled over the tribes of Israel.

Jeroboam I, the energetic king of the Ten Tribes of Israel, was elected when the ten separated from the tribes of Judah and Benjamin, at the death of Solomon in 931 B.C. As first king of this new union, he established two places of worship, one at the north and one at the south end of his kingdom, instead of letting his people go to the Temple at Jerusalem. At both places he built golden calves, thereby introducing idolatry into the worship which gradually degraded the nation.

Jeroboam II, the most prosperous of the kings of Israel. He raised the kingdom from a very depressed state upon ascending the throne in 790 B.C., and succeeded in restoring its former prestige by capturing Damascus, the capital of the Syrian empire, and Hammath, one of the Hittite towns. Amos and Hosea prophesied during his reign against the wickedness and idolatry which prevailed.

JEROME, *je rohm',* JEROME KLAPKA (1859-), an English novelist and dramatist, whose *Idle Thoughts of an Idle Fellow,* published in 1889, brought him fame as a humorist. Before succeeding as an author he had been successively clerk, stenographer, tutor, actor and journalist. Among his other books are *Three Men in a Boat; John Ingerfield, and Other Stories; Stage Land; Novel Notes* and several comedies. One of his latest books, *The Passing of the Third Floor Back,* has been dramatized. It is a play which exploits a spiritual element, and has drawn a class of persons to the theater who seldom go to see a play. It was one of the successes of the theatrical season of 1909-1910. The theme is the nobility of service; the spirit is that of the Master himself. It is an allegorical story of selfish, vulgar people in a boarding-house who are made into kindly, generous folk merely by the presence of the Christlike spirit.

JEROME, SAINT, a learned father of the Church and a prolific writer of theological and historical works, various letters, translations and works on the Bible. He was born at Stridon, a small town on the southern slope of the Illyrian Alps, about the year 340. From 374 to 379 he led the life of a recluse in the desert of Chalcis, southwest of Antioch. After these four years he went to Antioch, where he was ordained priest; he then went to Constantinople, where he acted as teacher and friend to Gregory of Nazianzus, and in 382 he returned to Rome. On the death of Pope Damasus he was compelled to leave Rome, as his position became a very difficult one on account of harsh criticisms which made him many bitter enemies. He settled in a monastery near Bethlehem in 386 and again became a recluse and student. His Biblical knowledge gave him rank among ancient expounders of the Bible. His Latin interpretation of the Old Testament was the foundation of the Vulgate (which see).

JEROME OF PRAGUE (1360-1416), a religious reformer who was burned at the stake for heresy in 1416. He was a companion and

champion of John Huss, and it was his vigorous vindication of Huss's principles that cost him his life. Together they waged an energetic fight against the faults of the Church and the corruptness of the clergy. Huss was thrown into prison in 1415 and Jerome hurried to his defense, but was arrested and put into chains. After a great deal of suffering he agreed to disavow his opinions of the Church, but later strongly defended his heresies and the principles of Huss and Wycliffe. He was burned at the stake May 30, 1416, and his ashes were thrown into the River Rhine. See HUSS, JOHN.

JERROLD, *jer'old,* DOUGLAS (1803-1857), an English dramatist, essayist and humorist, remembered chiefly for his humorous sketches, *Mrs. Caudle's Curtain Lectures,* and for his successful play, *Black-Eyed Susan.* The latter, produced in 1829 at the Surrey Theater, London, ran for 300 successive nights. He was born in London, and at the age of ten became a midshipman in the navy; two years later he apprenticed himself to a printer in London. By hard study he acquired a knowledge of Italian and Latin, but discovered that the bent of his genius lay in dramatic writing. After the production of *Black-Eyed Susan* he wrote several dramas that attracted attention, including *Time Works Wonders, Nell Gwynne* and *Rent Day.* He also acted as literary critic on the staff of *Punch* and founded the *Illuminated Magazine* and *Douglas Jerrold's Shilling Magazine.* His popular *Mrs. Caudle's Curtain Lectures,* the *Story of a Feather* and other witty stories were written for *Punch.* His best novels include *The Mad Mode of Money* and the *Chronicles of Clovernook.* His *Life and Works* was edited by his son, Blanchard Jerrold, and in 1903 a volume of his essays was edited by his grandson, Walter Jerrold.

JERSEY, *jer'zi,* the largest of the Channel Islands, in the English Channel, famous for its excellent breed of cattle. On this island they are raised in large numbers, and from it they receive their name. Jersey is located fifteen miles off the northwest coast of France. Its rugged northern coast slopes into a well-wooded table-land on the interior, where wheat and large quantities of grapes, peaches, melons and tomatoes are raised for exportation. The principal town, Saint Helier, which lies on the southern coast of the island, is overtowered by the imposing medieval castle of Mont Orgueil, while a short railroad connects it with Gorey and Saint Aubin. The island has an area of forty-five square miles, being only eleven miles long and four to six miles wide, but its population numbers over 50,000.

JERSEY CITY, N. J., the second largest city in the state, is the county seat of Hudson County and the most important suburb of New York City. The population in 1910 was 267,779; in 1916 it had increased to 306,345, of whom about sixty-eight per cent were foreign born. The city occupies thirteen square miles on a peninsula formed by the Hudson River and Upper New York Bay on the east and south and the Hackensack River and Newark Bay on the west. Directly east across the Hudson is the lower end of New York City. Ferries constantly cross the river between the cities, and under the river tunnels extend to Dey Street, Thirty-third Street and Sixth Avenue. Jersey City is the terminus of a large number of railroads, which enter the stations of the New Jersey, the Erie, the Lehigh Valley and the West Shore roads. Interurban lines operate to neighboring New Jersey towns. Transatlantic and coast steamers dock at extensive wharves on the east water front.

Bergen Hill, a continuation of the Palisades of the Hudson, extends through the city, rising in the northern part in a high, steep bluff. Hudson County Boulevard, a magnificent road, nineteen miles long and nearly 100 feet wide, follows the crest of the hill and extends through beautiful West Side Park, a playground of 207 acres. There are many smaller parks throughout the city. Handsome avenues and residences occupy the hill, while in the lower section to the east are the manufacturing and shipping industries.

Buildings and Institutions. Prominent buildings include the city hall, in front of which is a soldiers' and sailors' monument, a $1,000,000 Federal building, a courthouse, high school, People's Palace, Jersey Central Terminal, armory, the Saint Francis, Christ and city hospitals, a public library and a museum containing many colonial documents of historic interest.

The important educational institutions are Lightfoot Institute, City Normal School, Jersey City Dental College, Saint Peter's Academy, Saint Aloysius Academy and Manresa Hall. There are also many benevolent and charitable organizations.

Industries. Jersey City is a shipping and receiving port of importance; its figures, however, are included in those of the port of New York. There are extensive slaughtering and

meat packing establishments north along the river and pork slaughtering houses along the Passaic River. There are also large grain elevators. Among more than 400 industrial enterprises some of the largest are the Colgate & Company, the American Sugar Refining Company, the Lorillard tobacco factories and the Jos. Dixon Crucible Company. Among the hundreds of manufactures are included almost every kind of article.

History. The first buildings on the site of Jersey City were erected in 1633, and the place was originally known as Paulus Hook. Here occurred one of the most brilliant feats of the War of Independence. Fortifications erected by Americans were taken by the British, who were surprised and driven out by a small force under Lieutenant Colonel Henry Lee ("Light Horse Harry"). The Americans later evacuated, and the British again took possession until the end of the war.

The city was laid out and incorporated in 1804. Under the name of Jersey City it was reincorporated in 1820 and in 1838. Bergen and Hudson were annexed in 1869 and Greenville in 1873. The commission form of government was adopted in 1913. E.H.R.

Consult Mulrheld's *Jersey City of To-Day.*

JERUSALEM, *je ru'sa lem,* the chief city of Palestine, a city of every time and every tongue, theater of the best and the saddest in human history, long buffeted by waves of religious frenzy from the north, south, east and west; pagan, infidel, Hebrew, Christian, Mohammedan Jerusalem—a stage where the scenes have shifted for every act of human life. In the history of the city pomp and tragedy, pride and passion, hate and revenge, and the highest love ever known among men have played their parts. Not far from the city gates, on a hill called Calvary, the founder of the Christian faith, bearing a cross of misunderstanding and hate, far heavier than beams of wood, drank the last drop in the cup of human bitterness. To His followers throughout the world Jerusalem is a city peculiar unto itself, and it is no less sacred to the great Jewish race, the people who have kept their ancient faith unsullied through centuries of wandering and persecution.

Jerusalem lies on a plateau about 2,500 feet above the level of the Mediterranean Sea, within the fork of two ravines, the valley of Kedron on the east and the valley of Hinnom on the south and west. On the southwest rises the celebrated hill of Zion, and to the east of the city is the Mount of Olives.

History. The history of the city can now be traced, through the discovery of cuneiform tablets at Tel-el-Amarna in Egypt, back to the fifteenth century B.C. The name of the city

MODERN JERUSALEM

(1) Christian quarter
(2) Mohammedan quarter
(3) Armenian quarter
(4) Jewish quarter
(5) Church of the Holy Sepulcher
(6) Street of David
(7) Via Dolorosa
(8) Citadel
(9) Wailing Place
(10) Dome of the Rock
(11) Site of ancient Temple
(12) Calvary
(13) Gethsemane
(14) Tomb of Absalom
(15) Tombs of Saint James and of Zechariah
(16) Pool of Siloam
(17) Tomb of David
(18) House of Caiaphas

occurs on a number of these tablets, written *Urusalim,* which probably signifies "The City of the God Salim." In the fifteenth century all of Palestine was subject to Egypt and the country was divided up into provinces and sections controlled by governors who were responsible to the Egyptian king. Not long after the close of the fifteenth century, however, Egypt began to lose its hold in Palestine and Syria, and when the Hebrews began their conquest of Palestine, about 1200 B.C., we find the country an independent one in the possession of the Canaanites. Jerusalem itself was held by the group or clan known as Jebusites, from whom David captured the citadel. The Jewish king fortified the walls and built a palace for himself. In the days of his son and successor, Solomon, the palace was enlarged

and an imposing structure was erected as the dwelling place of the national deity Yahweh. The area of the city was also extended.

When upon the death of Solomon the Hebrew confederacy was split into two kingdoms, the northern and the southern, Jerusalem continued to be the capital of the latter, which, because of the prominence of the tribe of Judah, became known as Judea. The city shared the varying fortunes of the southern kingdom until 586 B.C., when it was captured by King Nebuchadnezzar of Babylonia. About half a century later when Babylonia itself fell into the hands of Cyrus, the Persian king, permission was given to the Jews to return to their country, and Jerusalem, which had suffered terribly during the siege, was rebuilt. The Temple of Solomon, which had been destroyed, was re-erected on the ancient site, but the structure was inferior in magnificence to that temple whose building formed the great achievement of Solomon's reign.

In 332 B.C. Alexander the Great conquered Syria, and Jerusalem passed into the control of the Greek governors of Egypt known as the Ptolemies. About two centuries later Jerusalem and all of Palestine came under the control of the Graeco-Syrian kingdom with its center at Antioch, the rulers of which were known as the Seleucides. A bitter conflict arose between the Greeks and the Jews which threatened at one time to stamp out the Hebrew religion. The sacred temple was desecrated by being made the center of the worship of Greek gods. Under the leadership of a family known as the Maccabees the Jews regained control of Jerusalem, and a new era of comparative prosperity ensued which lasted until the year 63 B.C., when the Romans under Pompey made Palestine a province of Rome. At the time of Jesus Jerusalem was under the authority of the Roman procurator, Pontius Pilate. The Jews submitted unwillingly to the yoke of Rome and in the course of a rebellion the ancient city once more became a mass of ruins in A.D. 70 by the orders of Titus. The Emperor Hadrian began the rebuilding of the city sixty years later, but changed its name to Aelia Capitolina.

WAILING PLACE OF THE JEWS
See location on map, on page 3141.

With the triumph of Christianity in the Roman Empire, Jerusalem again began to gain its position as a city now sacred to both Jews and Christians. Constantine the Great, the first Christian emperor of the Roman Empire, did much to restore the ancient city. It was he who built the Church of the Holy Sepulcher over the traditional site of the burial of Jesus. Jerusalem now became a shrine venerated by Christian pilgrims from all over the known world, and legends grew up concerning the places associated with events in the life of Jesus. As the years passed other beautiful buildings were erected. Saint Stephen's, north of the city, was built by the Empress Eudocia, and Justinian built Saint Mary's Church on the old Temple hill.

In 637 Palestine was conquered by the Mohammedans under the Caliph Omar, and in 691 the Mohammedans began the building of the great mosque known as the Harem esh-Sherif, popularly called the Mosque of Omar. It was erected on the site of the Jewish Temple around an ancient stone, the sanctity of which reverts to the days long prior to the occupation of the country by the Hebrews. This stone was known as the Dome of the Rock. Under Mohammedan dominion the city passed through many vicissitudes, culminating in the Crusades, or Holy Wars waged by the Christians for the possession of the sacred place. The Crusades ultimately failed, and in 1517 Jerusalem became a part of the Turkish Empire.

Modern Jerusalem. The modern city, whose population numbers about 80,000, is still surrounded by walls built in the Middle Ages. Outside of the walls, however, to the northwest, a large newer city has grown up containing Christian churches, hospitals and schools, many monasteries, and a large number of private dwellings, erected by Jews and Christians. The city within the walls is sharply divided off into four quarters, Christian, Armenian, Jewish and Mohammedan, and

the old gates, eight in number, are still in existence. The interior of the city is marked by narrow and crooked streets, some so narrow as scarcely to admit of the entrance of light. The sanitation of the city leaves much to be desired, but viewed from a distance the situation of the old sacred center is most impressive. The famous mosque, the Church of the Holy Sepulcher, and the chief synagogue, with many smaller mosques, make it a place of unusual picturesqueness.

Roads lead out from the city in all directions and a railroad has been in operation for some time between Jerusalem and Jaffa. Plans have been perfected for some time for a railroad net through Palestine which, when completed, will connect Jerusalem with Damascus to the northeast, with Haifa and Beirut to the west and northwest, and which will extend south through the wilderness of Sinai to the Suez Canal. The most marked change during the past decade has been the influx of many Jews, who now form by far the bulk of the population. This migration forms part of the Zionist movement, and strong efforts are being made to direct the newcomers into avenues of industrial and agricultural activities.

During the War of the Nations. Before the end of 1915 Jerusalem had become again a great military center. The city and vicinity were crowded with the soldiers and military equipment of the Turkish Empire, and the old cloisters and pilgrim hospices were thronged with the sultan's hosts. Not since the days of the Crusades had such things been witnessed in that sacred territory. The Holy Land again became what it had been in the days of the world powers of antiquity—Babylon, Assyria and Egypt—the military gateway between Asia and Africa. More important than campaigns and the spectacle of military operations profaning the scenes of great Bible stories became the question in the minds of religionists, the world over, Who would possess Jerusalem politically when the great war was over? E.D.F.

Consult Watson's *Story of Jerusalem;* Merrill's *Ancient Jerusalem.*

Related Subjects. The following articles in these volumes contain more detailed information as to certain persons and events mentioned in the above article:

Constantine I	Nebuchadnezzar
Crusades	Olives, Mount of
Cyrus the Great	Palestine
David	Pilate, Pontius
Jews	Solomon
Judea	Temple
Maccabees	Zionist Movement

JESSAMINE, *jes'a min.* See JASMINE.

JESUITS, *jez'u its,* or **SOCIETY OF JESUS,** a Roman Catholic religious order which was founded in 1534 by Ignatius Loyola (see LOYOLA, IGNATIUS OF), and approved by Pope Paul III in 1540. The members are bound by the usual vows of poverty, chastity and obedience; in addition, they are under oath to render entire submission to Papal authority and are forbidden to fill any of the higher offices of the Church. In the few instances in which Jesuits have been made cardinals or archbishops it has been at the command of the Pope. The constitution of the Order, which was drawn up by its founder, is with slight modification in force to-day. The general aims of the organization are the greater glory of God, the defense of the Roman Catholic faith against heresy, the spread of the religion in pagan countries, and the education of the young.

The Order is divided into four classes: *professed fathers,* or *priests,* from whom the generals and the higher officials of the society are chosen; the *coadjutors,* or *helpers,* including the lay brothers who perform the menial offices and minor duties of the institutions; *scholastics,* or *students,* who are preparing for priesthood; and *novices,* who are as yet bound by no vows. Supreme power is vested in the head of the Order, the "father general," who is elected for life.

The early development of the society was remarkable. It rapidly spread through Europe, and was the most successful influence directed against the rising tide of Protestantism. In this connection it was closely identified with the Counter-Reformation movement (see COUNTER-REFORMATION). But toward the end of the eighteenth century Pope Clement XIV, yielding to the pressure of the powers under the Bourbon influence, but acting wholly in the interest of "the peace of the Church," suppressed the Order in all countries. It was too powerful, however, to suffer more than a temporary eclipse; in 1801 it was partially reinstated by Pope Pius VII, and in 1814 was completely reëstablished.

As Educators and Missionaries. Since their organization, the Jesuits have been regarded as the leading and most scholarly of Catholic educators. Wherever they located they established schools and colleges of high order. They have been remarkably successful in their methods of teaching the classics, and the excellence of their scientific courses is shown by the fact

that such great astronomers of the nineteenth century as De Vico, Perry and Secchi were Jesuits. As a great educational factor, the Society reached its climax about the middle of the eighteenth century, when it controlled 728 colleges, with about 300,000 students. In 1906 it had 220 colleges throughout the world, with more than 55,000 students. In the United States it has educational institutions at Worcester, Mass., Boston, New York City, Georgetown, D. C., Jersey City, N. J., Washington, D. C., Baltimore, Chicago, Cincinnati, Detroit, Milwaukee, Omaha, Saint Louis, Saint Mary's, Kans., Galveston, Mobile, New Orleans, Denver, San Francisco, Santa Clara, Cal., Buffalo, Cleveland and Spokane. It has also a college at Manila, P. I.

The Society is one of the most zealous and energetic of all the missionary bodies of the Church. Saint Francis Xavier, the friend and companion of Ignatius, made many converts in remote parts of India and Japan. At a later period a band of devoted men penetrated into the heart of the Chinese Empire and other heathen nations. In America, Fathers Garnier, Jognes, Lallemont and others were martyrs to the cause. Father Marquette, who discovered the Mississippi River, heroically endured untold sufferings and hardships during his work among the Illinois Indians. These are but a few of the vast army of devout men numbered among the famous men of this Order who hesitated at no sacrifice or danger to spread their religious beliefs.

The Jesuits have always played an important part in the religious and political history of the world. No body of men, with the exception, perhaps, of the Jews, has ever been more vigorously attacked and persecuted than the Society of Jesus, but despite the difficulties which have always beset them, they are universally recognized as one of the greatest religious and educational forces of the world. In 1914 they numbered 16,715. The present head of the Order (since February 11, 1915) is Father Wlodimir Ledochowski, a nephew of a former cardinal of that name. G.W.M.

Consult McCabe's *Candid History of the Jesuits;* Parkman's *Jesuits in North America.*

JESUS CHRIST, the founder of the Christian religion, the Man who, of all that have lived, has influenced humanity most profoundly. In order to appreciate His influence a study of the relation of Christianity to civilization would be necessary, and that is impossible here; but to the most casual observer it is evident that civilization has reached its highest level in those countries which have come under the sway of Christianity (see CIVILIZATION). He was, in His life, the "Man of Galilee," the simple carpenter of Judea; yet most of the civilized world dates its chronology from His birth, and every use of the familiar letters B. C. or A. D. is a reference to His name.

Biographies of Jesus. There are four books which tell all that is known of the life of Jesus—the New Testament gospels of *Matthew, Mark, Luke* and *John;* and all the books upon books which have been written about Him through the ages add nothing, except in the way of conjecture, to what is told in those wonderfully simple narratives. Two of them, the gospel of *Matthew* and the gospel of *John,* were probably written by men who lived in close contact with Him as Disciples, during the last years of His life, the latter gospel being the work of the man who understood and loved Jesus best. The other two gospels, so far as critics can determine, were the work of writers who drew their information from men who had been companions of Jesus. Naturally, since the four authors differed in their temperaments and their interests, they viewed the words and acts of Jesus from different standpoints, and the various gospels place emphasis on different phases of the Teacher's life and works; but while they show this variation they are in harmony on all essential points. The sketch here merely touches the main events.

Early Years. Time in all Christian countries is counted from the birth of Christ, but when the reckoning began, centuries ago, there was a mistake made, and because of it we are committed to the error of saying that Jesus was born in 4 B. C., or perhaps in 6 B. C. His birthplace was Bethlehem, a little town in that Judea which had once been the seat of a Hebrew king, but was now a Roman province. On the imperial throne of Rome at the time sat the great Augustus, and historians state that for the first time in centuries the whole world was at peace and the doors of the temple of Janus in Rome were shut (see JANUS). The mother of Jesus was Mary, wife of Joseph the carpenter, and to her His coming had been announced long before His birth. His name of Jesus, too, which means *help of Jehovah,* or *Saviour,* was chosen for Him thus early. As to the exact day of His birth there has been much controversy, but since the fourth century December 25 has been honored and celebrated as His natal day (see CHRISTMAS).

God rest ye, little children; let nothing you affright,
For Jesus Christ, your Saviour, was born this happy night;
Along the hills of Galilee the white flocks sleeping lay,
When Christ, the Child of Nazareth, was born on Christmas day. —*D. M. Mulock.*

Miraculous circumstances attended the birth of Jesus, which occurred in the manger of an inn, while Joseph and Mary were in Bethlehem to pay taxes to the Romans. Angels, according to the gospel account, announced the wondrous event to the shepherds, while those who sought for the infant king were guided to His resting place by a peculiarly-brilliant star.

All that is known of the childhood and youth of Jesus may be told in very few words. When He was eight days old He was circumcised, in accordance with the Hebrew law, and a month later He was presented in the Temple at Jerusalem. Meanwhile, the wise men from the Orient had come seeking Him, and their quest had roused the jealousy of Herod (which see), who demanded to know where his rival, this "king of the Jews," was to be found. Because the wise men did not return with the information and he feared he might not find the right child, Herod ordered all the boy babies in and near Bethlehem to be put to death, but Joseph had been warned by an angel in a dream and had fled with Mary and Jesus to Egypt (see color plate, with article RUBENS). Herod died a few months later, and the little family returned to Nazareth, where Jesus lived until He reached manhood.

One gospel, that of *Luke,* tells of a single incident in the childhood of Jesus—how He was taken to Jerusalem for the feast of the Passover, and astonished the learned men in the Temple by His grasp on spiritual affairs. Save for this, and for the general statement, also made by Luke, that "the child grew and waxed strong, filled with wisdom, and the grace of God was upon Him," there is no comment upon His boyhood days. Legends there are in plenty, but they are not worthy of recognition, and it seems probable that Jesus lived quietly in Nazareth, following Joseph's trade of carpentering, helping to care for his family.

His Early Ministry. When He was about thirty years old, there came a change in His life. There had grown up in Him, no one can tell just how, the positive conviction that He was different from other men, and that therefore His mission was to be different. His work had been prepared for by the powerful preaching of John the Baptist (which see), that "voice of one crying in the wilderness," and to John Jesus submitted Himself for baptism, quite as repentant sinners had done. That He was not as other men, however, was witnessed by the very voice of God, who claimed Jesus from Heaven as "my beloved Son."

The next step was Jesus' retirement to the wilderness, where He passed a time of inward struggle as to the methods which He should use in His work. On His return from the wilderness John pointed Him out to certain of his followers as the Messiah, and these men transferred their allegiance to Him, becoming His first disciples. Jesus proved Himself very different from John, for while the Baptist was an unsocial man who loved solitude, Jesus showed from the first a love for His fellow men and a desire to mingle with them. Thus His first public appearance was at a wedding in Cana of Galilee, and there He helped the host out of his difficulties by turning water into wine. Very striking is His behavior on His visit to Nazareth, His home town, for He did not hesitate to declare in the synagogue in the presence of those who knew Him that He was the Messiah of prophecy, the fulfillment of the Scriptures. Then, returning to Jerusalem for the Passover, He made a still more public declaration of His mission by driving from the Temple the merchants and the money changers.

But despite the fact that they were deeply impressed, the people showed no tendency to accept Him, and Jesus withdrew from the capital city, passing through Sychar in Samaria, and there holding His noteworthy conversations with the woman at the well. It had become clear to Him that Galilee and not Judea must be the field for His ministry, and He chose Capernaum as the center from which to work. His first act was to choose formally as Apostles, as helpers in His great work of swaying public opinion, Peter and Andrew and James and John. Later He chose other men until He had twelve—twelve ordinary men to whom He meant to entrust His great work.

Second Year's Ministry. It is impossible to give in detail His movements and works, but certain "turning points" may be noted—events or sayings which marked definite epochs in His life. Having chosen His disciples He saw the necessity of giving them special instructions for the work before them, and one of His first acts was the statement of His principles. This

"constitution of the kingdom of Heaven," as it has been called, is best known as the *Sermon on the Mount,* and it contains all those principles which, while distinctly at variance with the standards of righteousness of the day in which Jesus lived, have been generally accepted as the essence of morality even by those who deny the divinity of Jesus.

Another "turning point" is to be found in connection with the woman who anointed His feet with the precious ointment, for it was at this time that Jesus claimed the right to forgive sin and so further enraged the Pharisees, already opposed to His teachings. Many miracles He performed, too, on various tours through Galilee, and these often resulted in discussions wherein Jesus pointed out the worthlessness of that righteousness which consisted merely in forms and ceremonies. And what was more, He gave to His disciples, whom He sent out on preaching tours, the power to work the same wonders at which they had marveled in Him.

Separating all that goes before from all that follows stands Jesus' declaration to His disciples that He must "suffer many things * * * * * * and be killed." They did not understand it entirely, but He never ceased to feel its influence, and from that time, as Luke says, "He steadfastly set His face to go to Jerusalem." The journey was a slow one, and included stops at more than one city, but Jesus never lost the consciousness that He was going toward His death.

The Last Months. These were of peculiar importance in the work of Jesus, and included such great events as the Transfiguration, such miracles as the healing of the man born blind and the raising of Lazarus, and many of His most significant discourses and parables. It must be kept in mind as a significant fact that Jesus was almost everywhere very popular with the common people, though these misunderstood His mission and believed that He was going to lead a revolution against Rome and bring back the glorious days of the Hebrew kingdom. It was the leaders who hated and feared Him, and who had determined on His downfall, and toward that downfall Jesus was hastening.

Passion Week. Interest centers in this last week of the life of Jesus, which began with that triumphal entry into Jerusalem which testified to the favor, enthusiastic if superficial, which He had gained in the eyes of the people. During the following days He spent some time in the city, cleansing the Temple for the second time, but long hours were spent in retirement at Bethany. Thursday night He observed the Passover with His disciples, establishing the Lord's Supper as a memorial of Himself, and shortly was arrested in the Garden of Gethsemane by the chief priests and Pharisees, to whom He had been betrayed by Judas, one of His disciples. He was examined by the ex-high priest Annas, given a sort of trial by the Sanhedrin (which see), taken before Caiaphas, the high priest, and finally turned over to Pontius Pilate, the Roman governor of Jerusalem, for only the governor could make legal the sentence of death which the Sanhedrin had passed against Him.

Convinced of the innocence of Jesus, Pilate yet allowed the clamors of the Jews, who had turned against their former favorite because He had not reëstablished the kingdom, to influence him so far that He gave Jesus over for crucifixion. On a hill outside the city He was crucified, with a criminal on each side, and after His death His body was taken from the Cross and buried by Joseph of Arimathaea and Nicodemus. The disciples and those women who had remained true to Jesus, felt that the end of all things had come—that their hopes had proved vain; but when on the morning of the first day of the week some of the women visited the tomb they found that the stone had been rolled from the door and that the body of Jesus was no longer there.

For forty days after His resurrection Jesus remained on earth, holding frequent intercourse with His apostles and other followers; and finally they were permitted to see Him received up into heaven. Jesus had in no sense organized the Christian Church, for even the formal preaching of His gospel did not begin until after the memorable day of Pentecost (which see). A.MC C.

Consult Case's *Historicity of Jesus;* Fairweather's *Background of the Gospels;* Mathews' *Messianic Hope in the New Testament;* Geike's *Short Life of Christ* (for young people).

JET. Near Whitby in Yorkshire, England, a variety of coal is found that is so hard that it can be carved into almost any form and polished so highly that it resembles black glass. This substance is generally known as *jet.* It is also found in various places in Germany, France and Spain. Jet is used for making buttons and dress ornaments. It was known to the Greeks and the Romans, and the former used powdered jet for toothache.

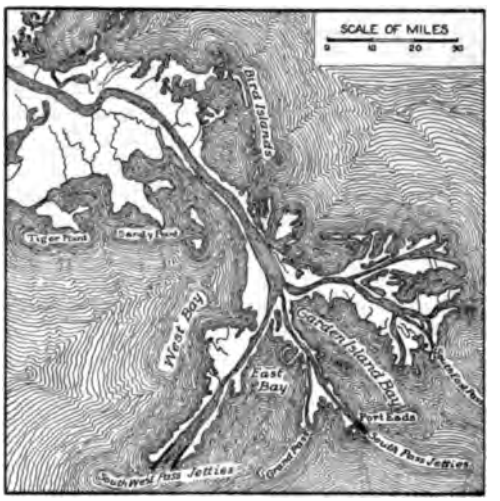
JET'SAM. See FLOTSAM, JETSAM AND LIGAN.

JETTÉ, *zhe tay',* SIR LOUIS AMABLE (1836-), a Canadian jurist and statesman, one time lieutenant-governor of Quebec, later chief justice of the superior court of that province, and in 1903 a member of the Alaska Boundary Commission (see ALASKA, subtitle *History*), which settled the dispute between the United States and the Dominion. Jetté was born at L'Assomption, Que., was educated at L'Assomption College, and was called to the bar in 1857. As a young man he was a frequent contributor to political and legal periodicals, and was also active in politics. He sat in the Dominion House of Commons as a Liberal from 1872 to 1878, but refused the position of Minister of Justice offered him in the latter year by Alexander Mackenzie. From 1878 to 1898 he was puisne judge of the superior court of Quebec, from 1898 to 1908 lieutenant-governor of Quebec, and in 1908 again returned to the superior court, of which he became chief justice in 1909. He resigned from the bench in 1911. Jetté was for many years professor of civil law, and later became dean of the law faculty, at Laval University. He was created Knight Commander of the Order of Saint Michael and Saint George in 1901. G.H.L.

JETTY, *jet'i,* a wall or pier, made of timber and stone, or of stone alone, built into a river or harbor to deepen the channel or for use as a breakwater. Sometimes jetties are built along the sides of streams to prevent further washing away of the banks. Many open harbors have great walls or banks built into the sea for added protection, such as the jetties of the harbors of Dunkirk and Calais in France, and in Galveston, Texas. The Columbia River on the Pacific coast of the United States has the longest jetty in the world, nearly four and one-half miles in length. Before it was built, the harbor was feared by all sailors, because of the shifting bars; now there is a single channel of the uniform depth of twenty-nine feet.

The Mississippi Jetties were built to keep the mouths of the Mississippi from filling up with the silt and fine sand that the water brings down in vast quantities. The river empties into the Gulf of Mexico through four principal mouths, known as *passes.* They are called Southeast Pass, South Pass, Grand Pass and Southwest Pass. In 1874 these mouths were so choked up with bars that large steamers could not get through. Captain James B. Eads (which see) suggested building two long jetties like two walls, along the banks and out into the Gulf. These would keep the water from encroaching on the land and would force it through a narrower channel so much more swiftly that the current would scour out the bars and keep the channel clear and of a uniform depth.

In 1875 the jetties were built. Rows of piles 1,000 feet apart were driven into the bottom to mark the position of the walls, then timber mattresses, made of willow logs fastened with planks, were sunk by piling stones upon them.



MISSISSIPPI JETTIES

The bottom layer of mattresses was fifty feet wide, but each layer was made narrower till the top one measured only twenty feet across. These dikes of timber and stone filled up with silt and sank deeper and deeper into the river bottom till they became immovable. Inside of two years a channel thirty feet deep had been made that has been maintained ever since. In 1906 similar jetties were built in the Southwest Pass, and both sets have been repaired and improved several times.

JEVONS, *jev'onz,* WILLIAM STANLEY (1835-1882), an English philosopher and economist, born at Liverpool, who was the first to simplify logic for the benefit of beginners. His principal works in this field are *Elementary Lessons in Logic; The Principles of Science,* and *Studies in Deductive Logic.* His works on political economy include *The Coal Question; Theory of Political Economy; The Value of Gold* and *Money and The Mechanism of Exchange.* He held a position in the royal mint of Australia; was professor of logic, and mental and moral philosophy, and Cobden lecturer on political

economy in Owens College, Manchester; and subsequently he held the chair of political economy in University College, London. His *Letters and Journals* were edited by his wife in 1886, four years after he was drowned while bathing near Hastings. See Logic.

JEWELRY, *jew el ri,* the collective name of a wide variety of gems and ornaments of precious metals and minerals worn by men and women for personal adornment. From earliest days, among the civilized and savage alike, the wearing of jewelry has been a dominant trait, for the passion for display is as old as man. When the savage cannot secure metals and gems, he paints his body for adornment, submits to tattooing, or wears pieces of bone, wood or iron inserted in the flesh of ear, lip or nose. Gold and silver ornaments probably date from immediately after the discovery of those metals; on account of its attractive color and the ease with which it can be shaped or "worked," gold has always formed the principal foundation of jewelry.

There is a great difference between modern jewelry and that made by the ancients. Machinery has entirely altered the methods of manufacture. The ancients depended on their hands and such rough tools as could be constructed to produce their effects. Metal was beaten, hammered and chased; the results were almost invariably harmonious and artistic combinations. In those days there was great opportunity for individuality and originality. In modern jewelry these have largely given place to conventionality.

Ancient Greek jewelry is remarkable for perfection of form and artistic ornament. Roman jewelry shows more barbaric splendor, while the most beautiful and artistic metal work of ancient times was produced by the Etruscans (see Etruria). The period of the Renaissance saw a great improvement in the making of jewelry. Designs became more chaste and artistic and inlaid work became fashionable. Diamonds and other precious stones were set flat, with a backing of metal. What is now called the rose diamond was introduced in the sixteenth century and immediately led to a lighter and more graceful setting. The jewelry of the Renaissance, even the jewelry of the Egyptians, executed nearly 3,000 years ago, has never been surpassed in elegance.

The chief centers of modern jewelry manufacture are London, Paris, Vienna and New York. Of recent years there has been a great increase in the manufacture of jewelry which imitates in its forms the highest grades, to meet the demands of those who cannot afford expensive ornaments. Gold-plated and gold-filled jewelry is manufactured in vast quantities, in conventional designs, while paste in imitation of diamonds, and glass substitutes for other precious stones, set in cheap alloy, are to be found in every jeweler's store.

Wearing of Jewelry Restricted. The wearing of jewelry is fashionable, but certain restrictions have sprung up in modern times. In semi-civilized or savage nations it is customary for a woman to wear all the jewelry she may possess; the result is frequently a display of barbaric splendor. In highly-civilized countries such adornment is considered an exhibition of bad taste. A little good jewelry which forms a tasteful display is always appreciated. Too much display is accounted a vulgarity. Sheridan, the noted wit, once came into conflict with a rival wit. Sheridan wore a plain signet ring and a simple, and good, watch fob. His rival had his fingers covered with rings, amidst which diamonds flashed. The diamond wearer was crushed by a remark of Sheridan's to the effect that he, Sheridan, relied on mental flashes, while his rival relied on purely artificial scintillations.

Consult Kunz's *The Curious Lure of Precious Stones;* Rathbone's *Simple Jewellery.*

Related Subjects. In this connection, the reader is referred to the following articles in these volumes:

Agate	Heliotrope
Almandine	Jade
Amethyst	Jasper
Aquamarine	Jet
Beads	Lapis Lazuli
Beryl	Onyx
Brooch	Opal
Cameo	Pearl
Carbuncle	Platinum
Carnelian	Ring
Chalcedony	Ruby
Coral	Sapphire
Diamond	Sardonyx
Emerald	Silver
Enamel	Topaz
Garnet	Tourmaline
Gems	Turquoise
Gold	

JEWFISH, the largest of the sea-bass family, found in tropical American waters. It is dark green or brown in color, has a large, flat head, dangerous teeth, huge mouth, and varies in weight from twenty to 700 pounds. It is attracted to rocky places. The black jewfish of Florida, which is also known as *warsaw,* is a favorite object of fishermen, for many speci-

mens of this family have been found to weigh 100 pounds, and some weighing 500 pounds have been recorded. The smaller specimens, weighing a few pounds and commonly called *black sea bass,* command a price higher than that of most sea fishes because of the excellent quality of their flesh.

JEWS, the common designation of the descendants of the ancient Hebrews, also known as ISRAELITES. For the older period the name Hebrew is the correct form, but for the period after the final destruction of national independence, the term JEW, designating a religious body of a common racial descent, is the proper designation. This name is from that of Judah, one of the Hebrew tribes. Judah became a general designation because the tribe of Judah formed the chief factor in the so-called southern kingdom of the Hebrews; and since through this kingdom, surviving the fall of the kingdom of Israel in the north, the Jewish religion was preserved, the term Judah, or Jew, was applied to all those who professed the religion that became known as *Judaism.*

The Hebrews belong to the Semitic branch of the human family, but since their dispersion throughout the world a considerable mixture with other ethnic groups has taken place. Despite the mixture, however, the Jews have retained on the whole their racial identity and many of their physical characteristics. While the dark skin, hair and eyes predominate among the Jews, there are several other types to be found among them. In ancient times the Hebrews were an agricultural people, but owing to their spread throughout the world and in lands where they were either forbidden to hold landed estates or where it was impossible for them to do so, they took up largely commercial pursuits; and in addition to commerce they have always distinguished themselves in intellectual and artistic attainments. The Jews have produced, wherever they have settled, a large number of musicians, artists, scholars and men and women in public life.

The total Jewish population of the world, according to the *Jewish Year-Book* for 1914, was 13,277,500, distributed as follows:

Africa	413,259
North America	2,500,054
Asia	356,617
Australia	19,415
Europe	9,988,197

History. The history of the Hebrews proper begins with the organization of a number of related tribes into a united group under the leadership of Moses (which see). Previous to the date of Moses there were a number of clans forming a part of the later Hebrew Confederacy, of whom merely tribal stories of no particular historical value have survived, and these are chiefly interesting because of the picture they unfold of the life of the Bedouins and of the pastoral nomads in early Palestine. The generation that followed upon Moses (1200 B. C.) began to move forward from their settlements in the wilderness around Sinai to the fertile fields on the west and partly to the east of the Jordan, occupied by the Canaanites. Several generations passed, however, before the Hebrews succeeded in dispossessing the Canaanites altogether.

During this period the tribes, while forming theoretically a confederacy, came together only for common defense against an enemy. Political necessity, however, led in the course of time to the formation of a kingdom composed of all the tribes, with a permanent ruler to exercise sovereignty over all. The first ruler of this character was Saul, who belonged to the tribe of Benjamin. He was succeeded by David, of the tribe of Judah, and David in turn by his son Solomon, under whom the little kingdom expanded to such an extent as to seem to later generations to have been the very climax in the political growth of the Hebrews. After the death of Solomon a serious break between the north and south occurred, which was never repaired.

The northern kingdom became the more powerful of the two, and being also the more ambitious, exhausted its vitality in struggles with surrounding nations and in endeavors to resist the progress of mighty Assyria. The northern kingdom, known as the kingdom of Israel, fell in 722 B. C. In that year the capital, Samaria, was taken, and Israel became tributary to Assyria. The southern kingdom survived until the year 586 B. C., when Nebuchadnezzar, king of Babylonia, fired by the martial ambitions of the Assyrian kings, succeeded in bringing all the kingdoms lying to the west of Babylonia up to the shores of the Mediterranean under his control. The city of Jerusalem was stormed, and in accordance with Assyrian and Babylonian custom, a large number of the influential inhabitants of the country were carried away into captivity so as to diminish the possibility of an uprising.

The Prophets. Before Jerusalem fell, however, a remarkable religious movement had set in under the guidance of a group of men

known as the Prophets, who, first appearing in the northern kingdom in the ninth century, extended their influence throughout the north and south. These Prophets set up a new religious ideal. Instead of regarding the national deity known as *Yahweh* merely as the protector of his people, they pictured him as a power ruling by self-imposed laws of righteousness and demanding that his followers should regulate their lives according to high ethical standards. When the Hebrews dispossessed the Canaanites they adopted many of the religious customs of the country. Against these customs, so far as they involved crude and materialistic conceptions of a divine protector, the Prophets protested, until finally the many sanctuaries, originally sites of Canaanitish worship, which had become centers of the Yahweh cult, were boldly denounced as illegitimate and the claim set up that Jerusalem alone, in which the cult had been purified of its objectionable elements, should be regarded as the place in which Yahweh could be properly worshiped. This revolutionary movement set in during the last half of the seventh century, and by the time the destruction of Jerusalem took place the reformation of the religion in the hands of the Prophets had advanced to such a point as to insure the continuation of the religious ideals of the Prophets, even though the national life was crushed.

The Hebrew Prophets are the real founders of the religion known as *Judaism*, and it was a natural corollary which expanded the national Yahweh into a *Jehovah* of universal sway, father of all mankind, whose control is not limited to any particular country or people.

During the Exile, and more particularly during the century after a semblance of national independence had again been instituted, though under the control of Persian governors, the religious ideas of the Prophets further developed until the time was reached when the Jews became the standard-bearers of a monotheistic religion, with ethical and spiritual ideals that placed it far above the religious standards prevailing in other countries. But as the religion grew in spirituality and in strength, the political life of the Jews (as we should now call them) steadily declined. True, Babylonia itself fell in the year 538 B. C., but the Persians, who, under Cyrus, then came into control, continued the traditions and the policy of both Assyria and Babylonia, though that policy was carried out in a more beneficent and wiser manner and worked less harm to subject peoples.

Cyrus dreamed of a world empire, as did Ashurbanapal of Assyria and Nebuchadnezzar of Babylonia, before him. Anxious to conciliate the Jews, he allowed them a certain measure of freedom. In accordance with this policy he permitted the Jews who had been carried to Babylonia to return to their country, and even granted a form of self-government of the country, though under the supervision of a Persian governor. To the pious Jews Cyrus became a deliverer, but chiefly because he allowed the rebuilding of the religious center of the people, the Temple at Jerusalem.

The Dispersal. The Persian rule came to an end in 332 B. C. when Alexander the Great overthrew the empire founded by Cyrus. After the death of Alexander, Palestine fell under the control first of the Ptolemies of Egypt and then of governors of the Seleucid kingdom. Only a semblance of political independence was permitted the Jews, and soon serious difficulties arose because of the fear on the part of the more pious Jews of complete assimilation between Jews and Greeks. The reaction against this tendency led to a short period of political independence under the control of a family known as the Maccabees. Internal quarrels, however, and the coming of the Romans soon put an end to any attempts at Jewish independence, and in the year 70 B. C. the city was destroyed by Titus. The result was a gradual dispersion of the Jews throughout the Roman Empire, though it must be borne in mind that ever since the earlier destruction by Nebuchadnezzar, in the year 586 B. C., this movement had really been going on. Indeed, several centuries before our era there were large settlements of Jews in Southern as well as in Northern Egypt, and, in particular, in the district around Alexandria. The Jews, too, at the time of the beginning of the current era had settled in large numbers in Assyria, throughout Asia Minor and had crossed over to Italy. The final extinction of political independence, however, lent a further stimulus to the dispersion, and in time Jerusalem became but a sacred memory and an ideal hope to the great bulk of the Jews scattered throughout the world.

The Jews encountered strange vicissitudes in the lands to which they came. In Egypt they attained considerable prominence and wealth, which lasted for several centuries. Large colonies of Jews gathered in Italy and then spread to Spain. At the same time settlements were made in Northern Africa, and during Mohammedan supremacy in that section and in Spain

the Jew flourished and unfolded a remarkable literary activity. From Italy and Spain they gradually spread into Southern France, into Germany and into England, while on the other hand, from Asia Minor the Jewish dispersion crossed over into Southwestern Europe and made its way to the Crimea and into Southern and Central Russia. These two waves of migration, one spreading over Western Europe towards the east and the other from Asia Minor across Southeastern Europe towards the north and west, met in Russia, which became the very center of Jewish settlements, comprising until recently considerably more than half of the entire Jewish population of the world (see RUSSIA).

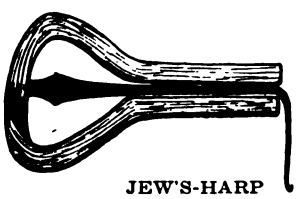
Persecutions. Restrictions and persecution often drove the Jews from one country to another. Driven out of Spain, after enduring unutterable hardships and after a thousand had been burned at the stake, thousands upon thousands passed northward into France and Holland or moved to the east in the Balkan states and other sections of Southeastern Europe. Enduring persecutions at various times in Germany, they nevertheless maintained themselves there. With the discovery of America at the end of the fifteenth century, and with permission to settle in England, which was given about the middle of the seventeenth century, a better era dawned for this ancient people. Gradually Europe awoke to the necessity of a thorough political reorganization, which led, as an inevitable consequence, to the political rehabilitation of the Jews in all countries, even in Russia, for after the revolution of 1917 which deposed autocracy the condition of the Russian Jews appeared more hopeful. In all the countries in which Jews have received the right of citizenship they have shown themselves to be thoroughly loyal, contributing their full share towards the social, political, intellectual and artistic advance of the lands in which they live and which they regard as their own country in the same sense as do their fellow-citizens of other creeds and of other national origins. M.J.

Consult Shurer's *History of the Jewish People in the Time of Jesus Christ*; Guerber's *Story of the Chosen People*; Wade's *Our Little Jewish Cousin*. Good stories are Wallace's *Ben Hur* and Stoddard's *The Swordmaker's Son*.

Related Subjects. The sketch of the Jews here given may be supplemented by the following articles in these volumes, and by the biographies of the famous men listed under the article BIBLE:

Bedouins	Maccabees
Bible	Nebuchadnezzar
Cyrus	Nomad Life
Hebrew Language and Literature	Palestine
Jerusalem	Semites
Judea	Temple
	Zionist Movement

JEW'S-HARP, a small musical instrument, deriving its name, according to some authorities, from the French word *jeu,* meaning *play,* from the fact of its being a toy. More probably it was named in ironic allusion to the harp of David. The instrument comprises two narrow metal prongs, open at one end and rounding into a circular form at the other end. To the latter is attached a flat spring which passes along between the prongs, terminating in a short section bent at a right angle. The prongs are held between the teeth, away from the lips, and the sound is produced by inhaling and exhaling air from the lungs, while the player strikes the upright spring with the finger. The device is an old one, being mentioned in 1619 by Praetorius in his *Organographia* under the name of crembalum.



JEW'S-HARP

JEYPORE, *ji poor'*. See JAIPUR.

JEZ'EBEL, a Bible character, portrayed as the cruel and heartless daughter of King Ethbaal of Tyre, and wife of Ahab, king of Israel. Her marriage with the latter was for the purpose of allying the two countries, and she won the disfavor of the people when she established her own form of worship at her husband's court. She opposed Elijah, the prophet, who bitterly denounced her, and she was accused of attempting to cause the death of certain other prophets. By her orders Naboth, a neighbor, was stoned to death for refusing to sell his vineyard to King Ahab (*I Kings* XXI, 1-13). Jezebel herself was finally murdered by Jehu (*II Kings* IX, 30-37), fourteen years after her husband's death. See AHAB; JEHU; ELIJAH.

JIG'GER, or CHIG'GER, a species of flea, resembling the common flea, except that it is smaller. It is found in South America, the West Indies and Southern United States. In the United States the name is applied to small red mites which burrow under the skin of vertebrate animals, causing great annoyance. The first indication of the presence of jiggers is a

tingling and slight itching; if the trouble is not remedied at once, painful festering sores result, though the bite is not fatal. Salt water will relieve the itching, but if the bite progresses to the festering stage, the wound should be cut or burned out. Another species attaches itself to poultry. The harvest mite, which attacks stems and leaves of the butterfly weed, is locally known as *jigger* in the Southwestern United States.

JIMSON WEED. See STRAMONIUM.

JINGO, *jing'go,* in modern politics, the name given to a party or to an individual displaying a blustering, warlike policy or attitude. The term was particularly applied in British political history during the Beaconsfield administration (see DISRAELI, BENJAMIN), 1874 to 1880, when the English government was hesitating over the policy of interfering in the war between Russia and Turkey. The epithet originated in the chorus of McDermott's *War Song,* first sung in a music hall in London, which expressed the jingo or war spirit of the Conservative party headed by the Earl of Beaconsfield:

"We don't want to fight;
But, by jingo, if we do,
We've got the ships,
We've got the men,
We've got the money, too."

In America the term expressing the same idea of boastfulness is *spreadeagleism,* and the bombastic war spirit is called *jingoism.*

JINRIKISHA, *jin rik'i shah,* also spelled JINRIKSHA, is a light, two-wheeled, hooded vehicle drawn by one man. A crosspiece is attached to the outer end of the shafts, which enables the runner to pull the conveyance. The *hiki,* or puller, travels long distances at a brisk pace, frequently covering from thirty to forty miles a day, and arriving at his destination apparently little fatigued by his exertions. The jinrikisha was invented in 1869 by an American Baptist minister named Goble; early in the same year a Japanese improved the crude original form by supplying springs and adding an overhead hood and wheel guards. The vehicle has been introduced into several Asiatic countries, but is most common in Japan, Chosen and in Eastern China.

THE JINRIKISHA

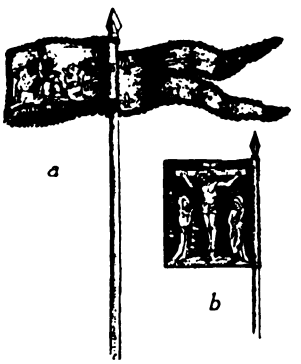
JIUJITSU, *joo jit'soo.* See JUJUTSU.

JOACHIM, *yo'a Kim,* JOSEPH (1831-1907), an Hungarian violinist and composer, considered the greatest master of technique of his period, was born at Kittsee, near Pressburg, of Jewish parents. He made his first public appearance at the age of seven, after which he studied under distinguished masters at Vienna and Leipzig. At the age of eighteen he was appointed leader of the grand duke's band at Weimar, which post he left owing to a disagreement with the composer Liszt. From 1853 to 1866 he was conductor of concerts and was solo violinist to the king of Hanover, and in 1868 became head of the Royal School of Music at Berlin. His most important work is the *Hungarian Concerto in D Minor;* his other compositions include overtures, marches, trios, ballads and various forms of chamber music. Joachim was the founder of a quartette which gained an enviable reputation. As a soloist he was called the king of violinists.

JOAN OF ARC, *jo an' of ark,* or more properly, JEANNE D'ARC, called THE MAID OF ORLEANS, was a gentle French peasant girl who led the soldiers of France to victory at the siege of Orleans and who was afterwards betrayed and burned at the stake. She was born in the village of Domremy, France, in 1412. While her brothers and sisters were sent out into the fields with their father, the mother kept Joan at home for the spinning and weaving. She was not taught to read and write, but she learned all that her mother could teach her of sacred things, and she grew to strong and comely girlhood, known throughout the village for her gentleness, her charity, her piety. This pure and innocent young girl was driven by visions, revelations from heaven she believed them to be, to leave her family and to make her way to the court of the king of France. Charles VII, then uncrowned. Dressed in her clumsy, red, peasant garments, Joan presented herself humbly to the king, who received her with great ceremony, probably with the idea of disconcerting her, and she finally prevailed upon him to accept her as the rescuer of France.

The Peasant Maid Leads an Army. Clad in full armor, with sword and banner, Joan of Arc

was mounted on a charger at the head of the French troops. For many weary years France had been divided against itself. English kings had fought unceasingly for possession of the French throne, and France had taken sides for and against them. The rough captains and soldiers of King Charles acknowledged no final authority, not even that of the king himself, but they bent the knee to this young girl. Fired by her courage and high enthusiasm, they marched on Orleans and raised the siege. They defeated the English in four other engagements and then marched to Rheims, where Charles was crowned king of France, Joan standing at his side, in that cathedral which was damaged almost five hundred years later by German gun fire in the War of the Nations.



BANNER AND STANDARD
(*a*) Joan of Arc's banner; (*b*) her standard.

The Great Leader Captured. This ended her mission, and Joan wished to return to the little hamlet where she was born, but Charles refused to consent to this. Not again, however, did the valiant girl leader know victory. In leading the attack on Paris, a shining mark in her armor for the English arrows, she was badly wounded, and on May 23, 1430, was captured by the Burgundians, French soldiers who were allied with the English. They sold her to the English for 16,000 francs (a sum slightly exceeding $3,000).

The English were not satisfied with her mere capture. Their fear of her was great, because of the adoration with which the French people regarded her. They were determined that she should die. So, after a long imprisonment, during which the young girl suffered untold humiliation and insult, Joan was tried as a witch and a heretic, because she had said that her mission had been revealed to her in visions from heaven. She was condemned to be burned at the stake.

Died a Martyr's Death. Ten thousand men stood in the market place at Rouen on May 30, 1431, and saw Joan of Arc face her terrible death with unfaltering courage. And "ten thousand men wept" at the dreadful sight. An English soldier or two tried to laugh, but one of the secretaries of the English king said, as he turned from the terrible scene, "We are undone; we have burned a saint." The final taunt of the English was to refuse her ashes burial. They were gathered up and thrown into the Seine River. In 1456 the young martyr was formally pronounced innocent of the charges brought against her, and in 1902 she was beatified by Pope Pius X, which means that she was made a saint in the Roman Catholic Church.

Her Memory Lives. There is scarcely a figure in all history that makes a greater appeal to the imagination than does this simple country girl. Many are the historical biographies that have been written about her short life, and she is the subject of innumerable poems and stories, plays, pictures and statues. Schiller and Lomet wrote tragedies based on her life; there is an historical drama by T. Tay-

HER NEWEST STATUE
Erected on Riverside Drive, New York City, in 1915. The pedestal was made in part from eighteen tons of stone brought from the dungeon at Rouen, from which Joan was led forth to martyrdom. The statue is of bronze, twenty-five feet in height, and weighs 8,000 pounds. It was the work of Anna Vaughn Hyatt. Her niece, Clara Hunter Hyatt, posed in armor for the figure. The total cost was $35,000, raised by popular subscription.

lor, an opera by Balfe, and an historical novel by Mark Twain. The English poet Southey published his poem, *Joan of Arc*, in 1796, and the French poets and writers have never stopped writing about her.

The cottage in which she was born still stands, preserved as a monument to her memory. Within is a copy of a beautiful statue of her, done by Marie d'Orleans, daughter of Louis Philippe. The spot in the market place in Rouen where she met her death is also marked by a statue. Another beautiful figure of her stands in the Place des Pyramides, in Paris, and there are monuments to her memory in countless towns and villages in France. The Metropolitan Museum in New York contains a beautiful painting of the Maid of Orleans by Bastien Lepage, and the Art Institute at Chicago has a great canvas by Boutet de Monvel, the French artist, who painted the six panels illustrating the career of "La Pucelle" for the church built to her memory at Domremy, her birthplace. On Riverside Drive, New York City, a great equestrian statue of Joan was placed in 1915. M.R.T.

Consult Catherwood's *Days of Jeanne d'Arc*; Lowell's *Joan of Arc*; Lang's *Story of Joan of Arc*.

Related Subjects. The reader is referred to the following articles in these volumes:

Charles (France)	Hundred Years' War
France, subtitle	Orleans
History	Rheims

JOB, *johb*, according to the Biblical narrative, was a wealthy chieftain living in the land of Uz about three centuries before Christ. His faithful spirit was sorely tried not only by the loss of his family and all his possessions, but also by having a serious disease attack him. Satan, who thought that Job's pious nature was a result of his prosperity, was allowed to try him by these misfortunes, but he remained steadfast in his allegiance to God in spite of his wife's tempting him to "curse God" and end his suffering.

The patience with which he endured his afflictions has become proverbial. Falstaff says in the second part of *Henry IV*, Part II, "I am as poor as Job, my lord, but not so patient." In the midst of Job's hardships three friends, Eliphaz, Bildad and Zophar, appeared to tell him that all his trouble was the result of sin, but with all he could say his sufferings and manner of bearing them he could not convince them that he was right. Finally he decided that some time everything would be made right (*Job* XIX, 25-26), and he was restored to more than his original prosperity, living 140 years in happiness.

In the Campo Santo, Pisa, is a series of six frescoes representing various periods in the life of Job, from the time he was a chieftain in Uz until his return to prosperity. Although it was long attributed to Giotto, Volterra is now considered the sculptor who did the work in 1370.

Book of Job, an ancient Hebrew poem which forms one of the books of the Old Testament. Although the date of writing is unknown, it must have been soon after the death of Job, who is the hero of the story. The book teaches that trust in God will bring events to happy conclusions, even though they may appear all wrong for a time, and that afflictions are not necessarily the result of sin.

JOFFRE, *zho'fr'*, JOSEPH JACQUES CESAIRE (1852-), commander-in-chief of the French armies in the War of the Nations until the fall of 1916, thereafter marshal of France and chief military adviser. When in 1911 his appointment to the highest military position in the republic was announced, few had ever heard of him, and so modest and retiring is he that in the ensuing three years he was scarcely ever brought into public notice. But his success in breaking the wave of German invasion at the battle of the Marne, in September, 1914, when the Germans expected to enter Paris within a week, gained him the complete confidence of the French people, and his subsequent conduct of his armies won him the admiration of the world. He was decorated with the Cross of the Legion of Honor, and was the dominant military man of the great war. In May 1917 he and Minister Viviani, with numerous assistants, were sent to the United States by France to confer with the American government regarding cooperation during the war. The mission traveled westward as far as Chicago and Saint Louis, and everywhere Marshal Joffre was re-

MARSHAL JOFFRE

The successful general of the allied forces in one of the most critical moments of the world's history.

ceived with great enthusiasm. The party visited the Lincoln tomb at Springfield, Ill.

General Joffre's parents were working people at Rivesaltes, in the Eastern Pyrenees. In military school he showed no brilliancy, but was a hard worker. He took part in the defense of Paris, in the Franco-German War of 1870, when not quite eighteen years old, afterwards entering the corps of engineers as a lieutenant. His rise was gradual, but steady, and was the result of ceaseless labor. He was decorated for service in Formosa in 1885, organized the defenses of Tongking, constructed a railroad in the Sudan in 1892, aided in the capture of Timbuktu in 1894, and built the defenses of Madagascar.

JOHANNESBURG, *yo hahn' es burg,* the most advanced city of South Africa, situated in the Transvaal province, where it is the central point of the gold-field district, known as Witwatersrand, and one of the richest in the world. It was founded on a desolate plateau, 5,600 feet above sea level, by foreigners who came in search of gold; they left, however, at the outbreak of the Boer War in 1899. The city has prospered and grown remarkably, until at present it has a population of nearly 240,000, about one-half of which is European. It is a thoroughly up-to-date city in every respect, with broad streets lined with fine buildings, and with street cars and electric lights. The city is connected by railway with Cape Town, Port Elizabeth, Pretoria, Durban and Delagoa Bay. It was the seat of the Uitlander hostility which led to the war with Great Britain, but was captured by the British troops under Lord Roberts in May, 1900. See SOUTH AFRICAN WAR.

JOHN (about 1167-1216), king of England from 1199 to 1216, remembered principally as the reluctant signer of the famous *Magna Charta,* the first great document embodying the principles of English liberty. He was the youngest son of Henry II, who called his son *Lackland,* probably because John was left without a portion when his father divided his dominions among his elder sons. John was appointed king of Ireland in April, 1185, but ruled so badly that he was recalled six months later. On the death of his brother Richard in 1199, John became king, although the French provinces of Anjou, Touraine and Maine declared that Arthur of Brittany was the rightful heir to the throne. A war followed, in which John recovered the provinces that had rebelled against him.

A serious quarrel with the Pope began in 1205, regarding the election to the see of Canterbury, to which Stephen Langton had been nominated by the Pope. Innocent III suspended the religious privileges of the whole kingdom and in 1211 issued a bull deposing John. Before Philip of France delivered the decree John made abject submission. John's methods of arbitrary rule, constantly growing more unendurable, led to a rising of the nobles of his court, and he was forced to sign the Magna Charta, or Great Charter, June 15, 1215. John obtained an edict from the Pope annulling the charter, raised an army of mercenaries and commenced war. The crown of England was offered to the dauphin Louis by the despairing barons, and he was received as lawful sovereign in 1216. The outcome was still doubtful when John was taken ill and died.

Related Subjects. The reader is referred to the following articles in these volumes:

England, subtitle *History*	Magna Charta
Innocent III	Philip II (France)
	Richard I

JOHN, the name of twenty-three Popes of Rome, who ruled between A.D. 523 and 1419. Among them the following are worthy of special notice:

John I, Pope from 523 to 526, succeeded Hormisdas. He was compelled by Theodoric, king of Italy, to visit the Emperor Justin II, at Constantinople, in regard to an imperial edict against the Arians, an heretical body in the Church. His mission failing in the desired result, he was imprisoned by Theodoric upon his return, and soon died.

John XII, Pope from 955 to 964, was elected when only eighteen years of age. His name was Octavian and he is credited with being the first Pope to assume a new name at consecration. In 962 he crowned Otho I, who, as emperor of the Romans, revived the title borne by Charlemagne (see HOLY ROMAN EMPIRE). Otho deposed John in 963, but the latter returned to Rome afterward and displaced Leo VIII, his successor.

John XIX, Pope from 1024 to 1033, was a Roman of the family of the counts of Tusculum. He succeeded his brother Benedict VIII. John crowned the Emperor Conrad II in the presence of the English king, Canute.

John XXII (JACQUES D'EUSE), Pope from 1316 to 1334, was a learned theologian, zealous in spreading the faith, and was also skilled in medicine. He excommunicated Louis of Bavaria, and favored Robert, king of Naples, who,

after being crowned emperor, deposed John. He collected large sums of money for the Church, but his own life was simple and self-denying.

John XXIII (BALTHAZAR COSSA), Pope from 1410 to 1415, was of a noble Neapolitan family. He called the Council of Constance, by which he was deposed. He fled, but was imprisoned, and after four years was released and appointed dean of the Sacred College by his successor, Martin V.

JOHN, KNIGHTS OF SAINT. See KNIGHTS HOSPITALERS OF SAINT JOHN.

JOHN BULL. See BULL, JOHN.

JOHN III, or **JOHN SOBIESKI,** *so byes' ke,* (1624-1696), king of Poland, a warrior and statesman who, as a military leader, was successful in keeping the Turk out of Western Europe and preserving, in his time, the national life of Poland. His service for his country against the Russians, Swedes and Transylvanians was so distinguished that in 1667 he was made commander-in-chief of the Polish army. His two most important victories were won against the Turks, the first at Khotin in 1673, the second at the siege of Vienna in 1683. Upon the death of the king, Michael Wisniowiecki, whose part in an unpopular treaty had brought about the Battle of Khotin, Sobieski was crowned king of Poland as John III (1674), and his wife was crowned queen.

JOHN OF GAUNT, *gahnt,* or *gawnt,* DUKE OF LANCASTER (1346-1399), an English soldier and nobleman, fourth son of Edward III and father of Henry IV. He was born in Ghent, Flanders, from which his name is derived, was created Duke of Lancaster in 1362, fought in the French wars under his brother, the Black Prince, and was made governor of Guienne. He was a friend of the poet Chaucer and supported John Wycliffe, the reformer, in his contest with the English clergy. In the play *Richard II,* Shakespeare introduces John as a prominent character. About half a century after the death of John of Gaunt, one of his descendants, Henry VI, representing the House of Lancaster, was deposed by the leaders of the rival House of York, thus bringing on the Wars of the Roses.

JOHNS HOPKINS UNIVERSITY, an educational institution of high rank, incorporated in 1867 at Baltimore, Md., and formally opened in 1876. Its permanence was assured by the generosity of Johns Hopkins, a prosperous merchant of the city, and the great school was named for him. On his death in 1873, he left a fortune of $7,000,000 to be devoted to the founding of a university and a hospital; the latter was opened in 1889. Johns Hopkins University became a pioneer among American institutions in the work of teaching by means of laboratories and courses requiring individual research, and it has won a national reputation for the excellence of its postgraduate and medical departments. Both the postgraduate and undergraduate departments offer courses in philosophy and psychology, mathematics, physics, chemistry, geology, zoölogy, botany, plant physiology, historical and economic science, education, ancient and modern languages and literatures. Students admitted to the medical department must hold a bachelor's degree or its equivalent. For the encouragement of research work, the university offers annually a large number of scholarships and fellowships.

When the institution was opened a temporary location in the heart of the city was chosen, but in 1902 a site in the suburbs was secured by gift, and the university was presented with an endowment of $1,000,000 by the citizens of Baltimore. Plans for the new campus and buildings were then worked out. In 1914 the mechanical and electrical engineering hall was occupied. At the beginning of the school year of 1916-1917 the greater part of the work was transferred to the new site; an academic building and a civil engineering building were also ready for occupancy at the same time. The university is equipped with a splendid library of nearly 200,000 volumes. In 1915-16 the faculty numbered 251 regular teachers and twenty-one lecturers, and the total enrolment, including students taking special courses and those registered for the summer session, was 1,688. Under the auspices of the university is published a considerable number of scientific and literary journals and occasional books.

The income-bearing funds have a present book-value of $6,674,000, and the property (real estate, building, books, apparatus and general equipment) is valued at $3,387,000. T.R.S.

JOHN THE APOSTLE, the "beloved disciple" and companion of Jesus, one of the first four chosen to be closely and intimately associated with Him as apostle. Before Jesus summoned John and his elder brother, James (which see), to follow him, the young men, with their father, Zebedee, were engaged in fishing on the Sea of Galilee. They had attended the preaching of John the Baptist along

dan, so they willingly left their work Jesus called them, together with two brothers, Peter and Andrew. Although ames and John were impulsive and ong, causing Jesus to give them the of *Boanerges,* or *sons of thunder,* their defects of character were overcome anged to elements of strength.

ie raising of Jairus' daughter, John was the three who were allowed to witness le the same three saw the transfigura- ad were the ones upon whom Jesus for comfort and sympathy in his hour and agony in Gethsemane. John fol- nis master to the crucifixion and at the esus commended his mother Mary to stle's loving care (*John* XIX, 27). For after that John returned to his old trade, but, following the Pentecost, he Peter in active missionary work. Both nprisoned by Jewish authorities; after freed, they were sent to Samaria by llow apostles to aid in the work which had begun. During the persecutions new Church in Jerusalem John stayed like a pillar of strength, where Paul him when he returned from his first ary journey (*Galatians* II, 9). In the part of his life John lived in Asia Minor, the seven churches there established nder his care. For a time he was exiled island of Patmos, where he wrote the *tion* (see REVELATION, BOOK OF), prob- A. D. 95, but at the beginning of Nerva's ie was allowed to return to Ephesus. he died some years later, but during the latter part of his life he wrote the *Gospel of John* (see GOSPELS), and the three *Epistles of John,* all four of which are included in the New Testament.

The Epistles of John are three short addresses. The first was to the Gentiles in Asia Minor; the second to the Elect Lady, which some consider as the Church; and the third, to the "well-beloved Gaius." All three urge the people to preserve their faith in God and especially their love for all that is good and holy.

JOHN THE BAPTIST (5 B. C. - A. D. 28), the great prophet and immediate forerunner of Christ, who in two years of public ministry not only prepared the people for Christ's appearance, but also pointed Him out to them. He was born in a small town, probably Hebron, in the hill country of Judah, just six months before the birth of Christ; the mothers of the two were cousins. After spending most of his life in seclusion near his home he appeared as a preacher in the wilderness along the banks of the Jordan in A. D. 26. He urged people to repent immediately from their sins, baptizing many who accepted his teaching, from which he received the name *John the Baptist.* Near the close of John's ministry Christ came to him to be baptized, and John, upon recognizing Him as the Messiah, proclaimed the fact to all the people. Soon after, Herod the tetrarch imprisoned John for things which he had said against his character, and later had him beheaded, to please the vindictive Herodias (see *Mark* VI, 17-28), who used as her instrument her daughter Salome.

OHNSON, ANDREW (1808-1875), an an political leader and statesman. He cted Vice-President of the United States 1 and succeeded to the Presidency on ath of President Lincoln. He was the enth President of the United States, e third Vice-President to succeed to the office through the death of the Presi- On him fell one of the greatest burdens which any President has ever borne, the problem of reconstruction of the Southern states. He shouldered the load with courage and a desire to do right, and pursued a moderate course, but he met opposition from a party which was controlled by strong partisans. The attempt to remove him from the Presidency by impeachment was generally regarded, even before his death, as ill-advised, and if for no

other reason, Johnson deserves to be remembered for his defense of the independence of the Chief Executive. If Johnson had been convicted, the President of the United States might thereafter have been more nearly a figurehead than a powerful force.

Personally Johnson had great faults. He was tactless and frequently used extreme language. Yet his career proved him a man of extraordinary ability. Lacking in education, always a "backwoodsman," he rose to high rank, and with the single exception of the Presidency, only through his own talents and iron will.

Andrew Johnson was born at Raleigh, N. C., on December 28, 1808. His father and mother, like Lincoln's parents, were very poor, and when the father died in 1812 his widow was left practically penniless. Andrew, therefore, was put to work as soon as possible. At the early age of ten he was bound out as a tailor's apprentice, and after serving for six years set up on his own account as a journeyman tailor at Laurens Court House, S. C. In 1826 he removed to Greeneville, in Eastern Tennessee, where he again opened a shop.

More important was the fact that here he met Eliza McCardle, whom he married on May 27, 1826. Johnson was not yet nineteen years old, and his bride was not sixteen, but they were both exceptionally mature, even for a region which encouraged youthful independence. Mrs. Johnson, a woman of refinement, was socially and intellectually the superior of her husband, but she always remained devoted to him. Johnson's marriage was the means of starting him on the upward path. As a boy he had enjoyed no schooling. With much labor he had taught himself to read after some of his fellow tailor-apprentices had taught him the alphabet. His wife taught him to write and to do simple problems in arithmetic, and while he sewed and stitched during the day she read to him.

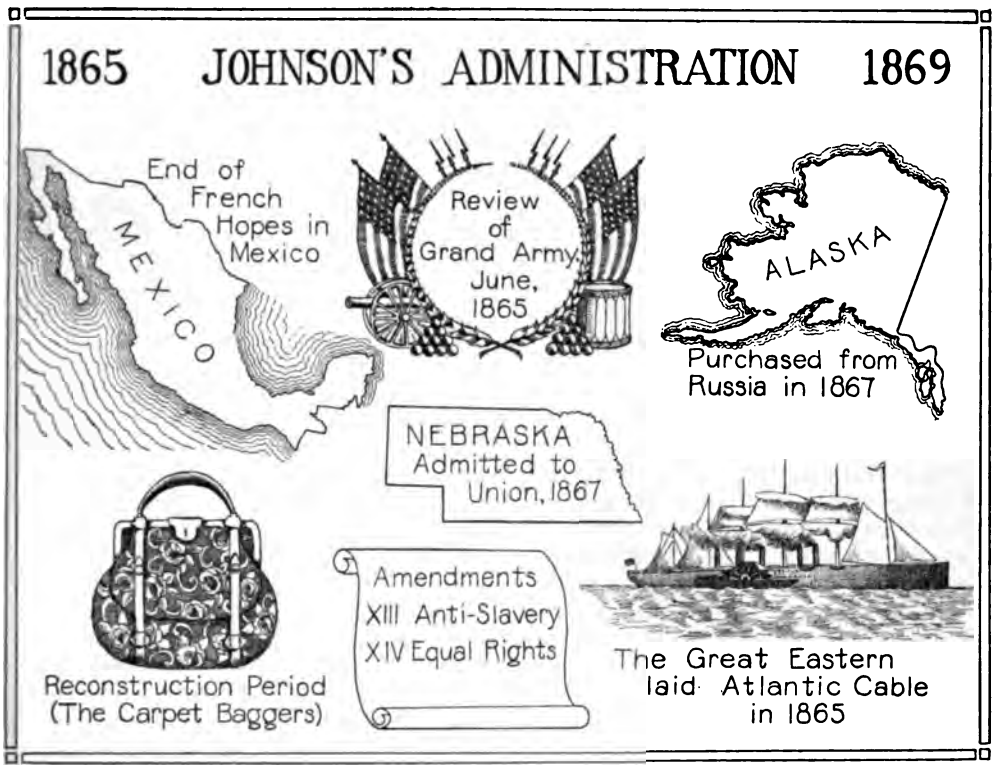
A Leader in Local Politics. At that time Tennessee was ruled, politically and socially, by the great land owners. Greeneville itself was controlled by an "aristocratic coterie of the quality," as it was called. Johnson, when only twenty years old, organized a workingmen's party in opposition, and was elected alderman. He was twice reëlected, and then served as mayor for three years. In the meantime, in order better to qualify himself for a public career, he was taking an active part in a local debating society, most of whose members were students at Greeneville College. In 1835 he proposed himself as a Democratic candidate for the Tennessee house of representatives, and was elected. His opposition to a bill for internal improvements caused his defeat for reëlection in 1837, but the reaction and the hard times which followed the panic of that year justified his action and restored his popularity. He was returned to the legislature in 1839, made a state-wide reputation as a campaign orator for Van Buren in 1840, and in the next year was chosen to the state senate. Here he distinguished himself by proposing

ANDREW JOHNSON

Johnson was a Democratic Vice-President under the Republican Lincoln—a choice designed to emphasize the coöperation of parties which it was thought the times demanded. Of Johnson, Woodrow Wilson writes, as follows, in his *History of the American People:* "Mr. Johnson was a man who, like Mr. Lincoln himself, had risen from very humble origins to posts of trust and distinction; but his coarse fiber had taken no polish, no refinement in the process. He stopped neither to understand nor to persuade other men, but struck forward with crude, uncompromising force for his object, attempting mastery without wisdom or moderation."

that the basis of representation in the legislature should be the number of white voters alone, regardless of the number of slaves.

A Wider Political Field. Up to this time Johnson was practically unknown beyond the boundaries of Tennessee. He was then thirty-five years old, had been in politics for fifteen years, and had become the recognized political leader of Eastern Tennessee. In 1843 he entered a new field, a ten-years' service in the United States House of Representatives. In Congress he was a conspicuous supporter of Polk's administration, particularly on the Ore-



gon boundary dispute and the question of war with Mexico. He approved the Compromise of 1850 as a matter of expediency, but as a general proposition opposed all compromise as a sacrifice of principles. He urged the adoption of a homestead law and low tariffs, and consistently opposed the policy of internal improvement. In 1853 the Tennessee Congressional districts were rearranged in such a way that Johnson's district was overwhelmingly Whig. Instead of vainly seeking reëlection, he announced himself as a Democratic candidate for governor, and was easily elected. He was an excellent governor. Himself an uneducated man, he became a champion of free public schools. He continued to urge the passage of a national homestead law and other measures for the benefit of the poorer classes.

Slavery and Secession. In 1857, after serving four years as governor of Tennessee, Johnson was elected to the United States Senate, where he was almost alone in his peculiar views on the great issues then under discussion. He did not, as has been said, believe in compromises, but it is interesting to note that his own views on political issues were moderate and usually occupied a middle ground. Thus he regretted the political power of the slave-owners, but opposed the anti-slavery agitation because it threatened danger to the Union. He voted to admit free California, but on the other hand felt that the territories should be allowed popular sovereignty and that Congress should protect the institution of slavery wherever it already existed. His Unionism, on the one side, and his defense of slavery, on the other, suggested his availability as a compromise candidate for the Presidency in 1860, and in the Democratic convention he received the vote of Tennessee. But when the convention split, Johnson withdrew his name and supported John C. Breckinridge.

Until the autumn of 1860 he seems to have believed that any organized attempt at secession was impossible, but once undeceived he left no doubt as to his own position. He was the only Southern member of Congress who refused to secede with his state. In a fiery speech before the Senate he announced his intention to stand by the Constitution, and on March 2, 1861, he said, referring to the secessionists, that he "would have them arrested and tried for treason, and if convicted, by the

eternal God, they should suffer the penalty of the law at the hands of the executioner." At Liberty, Virginia, on his way from Washington to Tennessee after this speech, he was attacked by a mob, which he held off with his pistol, and at other places he was hissed and hanged in effigy.

One year later, on March 4, 1862, President Lincoln appointed Johnson military governor of Tennessee. It was a position of great difficulty, in which he exercised the powers of an absolute autocrat, yet he showed moderation and restraint. His rule opened the way to the return of Tennessee to the Union, and in March, 1864, the state, under Johnson's orders, elected officers. Johnson's work had made him a national figure, perhaps the most conspicuous of the War Democrats. There was a general feeling at the Republican convention in 1864 that the sacrifices of the War Democrats demanded recognition, which was given by nominating Johnson for Vice-President on the ticket with Lincoln. In the light of later events it is important to note that in accepting the nomination Johnson explained that his acceptance did not involve a departure from Democratic principles, but was due to "the higher duty of first preserving the government."

Lincoln and Johnson were elected, and were duly inaugurated on March 4, 1865. Johnson was just recovering from an illness, and to strengthen himself for the ordeal of inauguration, had taken several drinks of strong liquor. In his weakened condition the stimulation was greater than he had expected, and when he came to deliver his inaugural address he was somewhat undignified and incoherent. His explanation was later generally accepted as satisfactory, but the incident was extremely unfortunate, for it created an unfavorable impression of the man, and was the basis of charges that he frequently drank to excess.

Administration of Andrew Johnson, 1865-1869. Lincoln and Johnson were inaugurated on Saturday, March 4; six weeks later, on Saturday, April 15, Lincoln died, a victim of the assassin's bullet. Johnson thus succeeded to the Presidency, and on the same day was sworn in by Chief Justice Chase. It was supposed that the new President would be harsh and vindictive toward the South. He was known to be bitter against the Southern aristocracy, and he had protested against the generous but just terms of surrender granted to Lee by Grant. Barely a month elapsed, however, before the public saw evidences of a change in the President's views, a change which was due partly to the sobering effect of responsibility and partly to the influence of William H. Seward, who remained in Johnson's Cabinet as Secretary of State.

The Beginning of Reconstruction. During the first six months of Johnson's term Congress was not in session, and long before December, when it met, it was apparent that the President had adopted Lincoln's policy of leniency. On May 9, 1865, he issued a proclamation restoring Virginia to the Union, and on May 29 declared a general amnesty to all except fourteen specified classes of citizens. Between May 9 and the middle of July the President also appointed seven provisional governors, whose duty it was to reorganize the state governments recently in the Confederacy. The reorganized governments at once passed stringent laws relating to the negroes, whose position, according to the radical Republicans in Congress, became worse than ever before. When Congress met the Republicans were in a large majority, and opposition to Johnson's plan of reconstruction increased because it was almost certain that the Southern Congressmen, if admitted, would vote with the Democrats. There was also a feeling that the Southern leaders had not been sufficiently punished, and many of the Northern members were angered at the possibility that men who had been in rebellion against the United States within a year might sit in Congress.

Break between Congress and Johnson. The first open break between Johnson and Congress came in February, 1866, when the President vetoed a bill to establish a Freedmen's Bureau (which see), for the protection of former slaves. Johnson's chief reason for vetoing the bill was that it had been passed by a Congress in which the Southern states were not represented. In July Congress passed a second bill to establish the Bureau; Johnson vetoed it and Congress passed it over his veto. In the meantime the President had vetoed the Civil Rights Bill, which made the freedmen citizens, because according to his view it interfered with the rights of the states. Congress repassed the bill over his veto, and then proposed the Fourteenth Amendment, which contained the principles of the bill. Johnson disapproved of the amendment, but it was ratified by the required number of states and went into effect July 28, 1868.

Johnson's Views. In considering the President's veto and disapproval of these measures

OUTLINE AND QUESTIONS ON ANDREW JOHNSON

Outline

I. Early Years

(1) Birth and parentage
(2) Boyhood
  (a) Lack of education
  (b) Apprenticeship
(3) Removal to Tennessee
(4) Marriage

II. Early Political Career

(1) The "workingmen's party"
(2) As mayor
(3) In the Tennessee legislature
(4) In the House of Representatives
(5) As governor of Tennessee
(6) In the Senate
(7) Attitude toward secession
(8) Military governor of Tennessee
(9) Elected Vice-President
  (a) Concession to War Democrats

III. Administration

(1) Reconstruction problems
  (a) Change in President's views
    1. Adoption of Lincoln's lenient policy
    2. Proclamation of amnesty
  (b) Attitude of Congress
  (c) Freedmen's Bureau Bill
  (d) The Civil Rights Bill
  (e) The Fourteenth Amendment
(2) Quarrel between President and Congress
  (a) Tenure of Office Act
  (b) Command of army taken from President
  (c) Removal of Stanton
(3) Impeachment
  (a) Charges
  (b) Results
(4) Other events
  (a) Purchase of Alaska
  (b) Withdrawal of French army from Mexico
  (c) Atlantic Cable laid
  (d) Nebraska admitted to the Union
(5) Election of 1868
  (a) Candidates
  (b) Issues
  (c) Results

IV. Later Life

(1) Election to Senate
(2) Death and character

Questions

How many Southern Congressmen took the same attitude that Johnson did at the outbreak of the War of Secession?

What might have been the results for the Presidential office if Johnson had not resisted the attacks of Congress?

Why was he suggested as candidate for President in 1860?

What was Johnson's attitude toward the Southern states after the war? How did it compare with Lincoln's?

What were Johnson's reasons for vetoing two important measures which Congress was determined to put through?

Why was Johnson's marriage of unusual significance?

What was the cause of his changed views as to the South?

What was his last important act as President?

In what way did his ancestry and his early life resemble those of Lincoln?

What was "Seward's Folly," and why was it so called?

Why was it easier to communicate with England at the close of this administration than at the beginning?

For what should Johnson be chiefly remembered?

What speech of his caused him to be mobbed, hooted, and hanged in effigy?

In what picturesque way did Johnson express his scorn for the lessening of Presidential powers attempted by Congress?

it must be borne in mind that he had never pretended to be anything but a states-rights Democrat, except in so far as he had held the preservation of the Union to be a fundamental necessity. According to his own views, he was on firm constitutional ground. The repassing of the bills over his veto led him to take part in the Congressional elections in the autumn of 1866, but in spite of his somewhat undignified efforts, the radical Republicans remained in control of Congress and at once put into effect their reconstruction policy. Johnson's policy, which was also Lincoln's, was based on the assumption that the Southern states had never been out of the Union, and that the Federal government must recognize the new state governments whenever these complied with the Constitution. Accordingly, punishment could be inflicted only upon individuals.

The Congressional Plan. The Congressional plan, on the contrary, was based on the theory that the Southern states were no longer part of the Union and were conquered territory. The chief features of the Congressional plan were to prevent the late Confederates from voting, and to give the negroes the right to vote. Johnson's plan, as stated above, was also Lincoln's plan, but even if Lincoln had lived it is doubtful if he could have carried it through. Johnson lacked the tact to conciliate a stubborn Congress; and worse, he expressed the most uncomplimentary opinions about it. In return Congress rejected Johnson's plan entirely and proceeded to work out its own plan. A bill was passed depriving the President of the power of proclaiming a general amnesty, and another bill took from him the command of the army by providing that all orders from the President must be transmitted to the army through the general, who could not be removed without the consent of the Senate. Then Congress passed the Tenure of Office Act (which see), which took away the President's right to remove civil officers of the government. Johnson vetoed these bills, but they were passed over his veto. By these laws the independence of the President was practically destroyed. Congress divided the South into five military districts, and proceeded to maintain the "reconstructed" governments in power by military force.

Removal of Stanton and Impeachment. The climax in the quarrels between Congress and the President was still to come. The Cabinet, which had at first supported Johnson, later divided in its opinions. So outspoken was the opposition that Johnson finally suspended from office Edwin M. Stanton, Secretary of War, and appointed General Grant in his place. Congress refused to ratify the suspension, Stanton again assumed the duties of his office, and was again removed by the President. Stanton refused to yield, the Senate declared this removal illegal, and the House of Representatives, on February 28, 1868, passed a resolution impeaching the President (see IMPEACHMENT). Of the eleven counts in the articles of impeachment the most important were the first, which stated that the removal of Stanton was contrary to the Tenure of Office Act, and the eleventh, a general charge that the President had committed a series of misdemeanors in his attacks on Congress.

The trial began on March 5, 1868. After the trial began Johnson made a series of violent speeches on a tour which is famous as "swinging around the circle," because he said in one speech that he had swung around the circle of offices from alderman to President. Many of the charges against the President were trivial and were supported by inconclusive evidence; the lawyers for the prosecution appealed chiefly to the violent political passions of the day. The first vote in the Senate, taken on May 16, was on the eleventh count; the result was thirty-five votes for conviction, nineteen for acquittal. A change of one vote would have given the prosecution the two-thirds majority necessary for conviction. Ten days later a vote was taken on two other counts, with the same result. No ballot was ever taken on the remaining counts. By the margin of one vote the President was saved from removal.

Other Events of the Administration. The struggle between Congress and the President and the disorders of reconstruction in the South were the outstanding features of Johnson's Presidency, but they should not be allowed to exclude attention from other events. The most important of these was the purchase of Alaska from Russia in 1867 for $7,200,000. The purchase was opposed by many leaders of public opinion, who referred to it as "Seward's folly," but the transfer was finally approved by the Senate. In the same year Seward made vigorous protests to France against the presence of a French army in Mexico, with the result that the army was withdrawn and the empire of Maximilian fell (see MAXIMILIAN; MEXICO, subtitle *History*). After two unsuccessful attempts, the Atlantic cable was suc-

cessfully laid in 1865 (see CABLE, SUBMARINE; FIELD, subhead *Cyrus W. Field*). Nebraska was admitted to the Union in 1867.

The last months of Johnson's term were uneventful. He was a candidate for the Democratic nomination for President, and on the first ballot he stood second on the list. The convention finally nominated Horatio Seymour, who was defeated by U. S. Grant, the Republican candidate. Johnson's last important official act was the proclamation, on Christmas Day, 1868, of complete pardon to all who had been directly or indirectly concerned in secession. After his return to Tennessee he was not satisfied with retirement, and made several unsuccessful attempts to secure a seat in Congress before he was finally elected to the Senate. He took his seat in March, 1875, during a short special session. He died on July 31, 1875, as the result of a stroke of paralysis. He was buried at Greeneville, Tenn., his old home. W.F.Z.

Consult Jones's *Life of Andrew Johnson;* DeWitt's *Impeachment and Trial of Andrew Johnson;* Stoddard's *Abraham Lincoln and Andrew Johnson.*

JOHNSON, [EMILY] PAULINE (1862-1913), a Canadian poetess whose works first gained wide notice because her father was a full-blooded chief of the Mohawks. Her poems have continued to find an audience, however, because of their fresh themes and her imaginative treatment of nature. One of her most familiar poems is the *Lullaby of the Iroquois,* a part of which follows:

Little brown baby-bird, lapped in your nest,
Your straight little cradle-board rocks you to rest;
It swings from the down-bending branch of the oak;
You watch the camp flame, and the curling grey smoke;
But, oh, for your pretty black eyes sleep is best,—
Little brown baby of mine, go to rest.

Pauline Johnson was born at Chiefwood, on the Grand River Reserve, in Ontario. Her father was George Johnson, head chief of the Mohawks, and her mother was Emily Howells, an Englishwoman. Their child was given instruction by private tutors, and later attended the Brantford Model School. In 1894, while on a visit to England, she published her first volume of verse, *The White Wampum.* Her later poems were collected in *Canadian Born* and *Flint and Feathers.* Among her best poems, which are usually on Indian subjects or on Canadian scenery, are *The Death Cry; A Cry from an Indian Wife; As Red Men Die; The Song My Paddle Sings,* and *In the Shadows.* She also wrote two volumes of fiction, *The Moccasin Maker* and *Shagganappi.*

JOHNSON, HIRAM WARREN (1866-), the man who freed California from the political control of the Southern Pacific Railway, was born in Sacramento and educated at the University of California. He was admitted to the bar at the age of twenty-one and was soon recognized as an able lawyer. He did not attract public attention, however, until the prosecution of the graft cases in San Francisco in 1906 and 1907. Johnson was assistant prosecuting attorney for the state, and when Francis J. Heney, in charge of the prosecution, was shot, Johnson took charge of the cases and carried them to success with remarkable ability, securing the conviction and imprisonment of the most notorious of the defendants. In 1910 Johnson was nominated for governor by the progressive branch of the Republican party. He made an automobile tour of the state, giving special attention to the farmers. His slogan was "The Southern Pacific Railroad must be kicked out of state politics," and at the end of a hard campaign he was elected. During his first term as governor he disposed of many inefficient officers, established civil service for state employees, created a railroad commission, instituted the referendum and recall and secured the passage of laws granting woman suffrage and establishing primary elections.

Governor Johnson took a prominent part in the National Republican Convention of 1912. He opposed the candidacy of President Taft and strenuously objected to the methods and rulings of the Republican National Committee in seating certain delegates. He followed ex-President Roosevelt in forming the new Progressive party and became its candidate for Vice-President. In 1914 he was again nominated for governor and elected by a plurality of 188,500. In 1916 he was sent to the United States Senate, and therefore resigned the governorship.

JOHNSON, RICHARD MENTOR (1780-1850), an American soldier and statesman, Vice-President of the United States during the administration of Martin Van Buren. He was born in Kentucky and received his education at Transylvania University, beginning his political career, in 1805, with election to the Kentucky legislature on the Democratic ticket. He was a Representative in Congress from 1807 to 1819,

and during this time became colonel of a regiment that fought in the War of 1812. Johnson distinguished himself in the Battle of the Thames where, it is said, he shot the Indian chief, Tecumseh. In the Democratic convention that nominated Van Buren for the Presidency, Johnson was selected as candidate for the Vice-Presidency. When the electoral votes were counted, however, it was discovered that the choice of Vice-President was prevented by the action of the Virginia electors, who had voted for William Smith of Alabama. The election was accordingly thrown to the Senate, which gave Johnson a majority vote. In 1844 he was an unsuccessful candiate for the Democratic nomination for the Presidency.

JOHNSON, SAMUEL (1709-1784), an English writer of the eighteenth century, one of the most striking and original personages not only of his age but of the whole period of English literature. He wrote no masterpiece, either in prose or in poetry, and his famous *Dictionary*, though of value as the first important attempt at an English lexicon, is now regarded as a literary curiosity. It was Johnson's astonishing personality, more than his literary achievements, that made him the dominant figure of his time and has kept his name alive.

SAMUEL JOHNSON

Thanks to a remarkable biography, written by an obscure barrister named James Boswell (which see), the world has come to know the life and character of Johnson in every detail. In that famous *Life* is pictured a large, awkward man, vulgar in appearance and uncouth in manner, with his face scarred with the marks of disease, who tells his hostess to stop talking nonsense, who calls a distinguished guest a "vile Whig," who leans back at the table to "blow out his breath like a whale" and who abuses everybody that disagrees with him. Yet, to use the words of Carlyle, he was a "mass of genuine manhood, a man who would starve before he bartered away his independence and who was loved and honored by all who knew him."

Johnson was the son of a poor bookseller of Lichfield, in Staffordshire. He was born with a tendency to scrofula, and when a child of three was taken on a futile journey to London by his parents to be healed with the "royal touch" of Queen Anne. His constant reading of his father's books proved a more important education than his regular schooling. He entered Oxford in 1728, but his extreme poverty compelled him to leave the university after a little more than two years. In 1735 he married a woman old enough to be his mother, whom he loved devotedly, and with her dowry of £800 (about $4,000) they started a private school in Lichfield.

This proved a failure, and he journeyed to London to begin life as a writer. Years of poverty and discouragement followed, but he slowly won a name for himself, and when in 1762 George III granted him a yearly pension of £300, or about $1,500, life brightened for him. With Joshua Reynolds, a renowned artist, he founded the famous Literary Club, where he out-talked the greatest literary men and artists of the day. One who wishes to read these celebrated conversations will find them recorded in Boswell's *Life*.

Johnson became a regular contributor to the *Gentleman's Magazine* in 1738, the year in which he published his first poem, *London*. The best of his poetic works, *The Vanity of Human Wishes*, appeared in 1749, and soon after his tragedy, *Irene*, was produced at the Drury Lane Theater. The success of Addison's *Spectator* encouraged him to begin the *Rambler* (1750-1752) and the *Idler* (1758), but his heavy, ponderous style prevented his periodicals from becoming popular. Goldsmith said that Johnson would make "little fishes talk like whales."

Meantime he had begun work on the *Dictionary of the English Language*, which, after eight years of toil, he issued in 1755. Humor and prejudice appear frequently in this remarkable work, as shown in his definition of oats—"a grain given in England to horses, and in Scotland to the people." His only novel, *Rasselas*, which was published in 1759, was written to provide money for his mother's funeral. In 1775 he wrote a description of a journey to Scotland and the Hebrides, made in company with Boswell; three years before his death he completed his last literary undertaking, *Lives of the Poets*, the most readable of his works.

JOHNSON CITY, TENN., a town in Washington County, in the extreme northeastern section of the state, of some note as a summer

resort on account of its picturesque scenery and healthful location. Bristol is twenty-five miles northeast, Knoxville is 106 miles southwest and New York is 625 miles northeast. The East Tennessee & Western North Carolina and the Carolina, Clinchfield & Ohio railways serve the town. In 1910 the population was 8,502; it increased to 10,925 in 1916, by Federal estimate. It is almost exclusively American.

The first settlement was made in 1870, and a city charter was granted in 1897. The area exceeds seven square miles.

Johnson City occupies an elevated site in a beautiful, mountainous district, Roan Mountain, 6,313 feet, being the most noted peak. The town also has manufacturing interests which employ about 2,200 people; the most prominent are rolling mills, iron furnaces, machine shops, tanneries and brickyards. The notable buildings are the Mountain Branch of the United State Soldiers' Home, just outside the town limits; it was established at a cost of $2,500,000. There is also a $71,000 Federal building, and a public library. The East Tennessee State Normal School is located here.

JOHNSTON, *jon'stun,* ALBERT SYDNEY (1803-1862), a leading Confederate general in the American War of Secession. He was born in Washington, Ky., and was graduated from West Point in 1826. He became chief-of-staff to General Atkinson in the Black Hawk War and in 1837 joined the Texans in their struggle for independence from Mexico, superseding General Houston as commander-in-chief of the Texan army. After the Mexican War he joined the United States army. In 1857 he commanded the expedition against the Mormons in Utah, winning the brevet of brigadier-general for his skill and discretion. At the outbreak of the War of Secession he united his fortunes with the Confederate States, and in 1861 the Confederate government made him commander of the military forces in Kentucky and Tennessee. At the battle of Shiloh, on April 6-7, 1862, when Grant halted to rest his men and wait for General Buell to join him, Johnston, with a greater force, fell upon the Federals. Grant was driven back, but in a moment of apparent victory Johnston was struck by a rifle ball and soon died. With the exception of Lee, he has been ranked as the ablest of the Confederate generals.

JOHNSTON, JOSEPH EGGLESTON (1807-1891), an American soldier and Confederate general, born in Cherry Grove, Va. His father was a jurist, and his mother was a niece of Patrick Henry. In 1829 he was graduated at West Point, Robert E. Lee being a classmate. During the Seminole War he acted as aid to General Winfield Scott and earned the brevet of captain, and in the Mexican War he was twice wounded at the battle of Cerro Gordo. In 1855 he became colonel of the First United States cavalry, and in 1860 was quartermaster-general of the army.

JOSEPH E. JOHNSTON

At the outbreak of the War of Secession Johnston resigned from the army when Virginia seceded, and was soon commissioned a brigadier-general by the Confederate President. He was assigned to a command in the Army of the Shenandoah and took an active part in the first battle of Bull Run in July, 1861, coming to Beauregard's aid with his army. At the battle of Fair Oaks on May 31, 1862, he was wounded, and afterward was assigned to the military department of Tennessee. He opposed General Sherman in the Atlanta campaign and won the battle of Kenesaw Mountain. His policy of being too cautious was criticized, and in July, 1864, he was superseded by the more venturesome Hood. Early in 1865 he commanded the Carolina Confederate forces, but on April 26 surrendered to Sherman, the terms being similar to those accepted by Lee. He published a *Narrative of Military Operations,* which was largely a vindication of himself in the charges brought against him. In 1887 he was appointed commissioner of railroads by President Cleveland.

JOHNSTON, MARY (1870-), an American novelist, who takes the facts of early American history and weaves romances about them. She was born at Buchanan, Va., November 21, 1870; ill health made it necessary for her to receive her education from governesses. When she was eighteen years old she visited Europe with her father. Notes on her trip were published in a Virginia newspaper, and this was her first literary contribution. Her first novel, *Prisoners of Hope,* a romance of Virginia, was published in 1898, and Miss Johnston immediately found a place among the literary celebrities of the country. *To Have and to*

Hold, a colonial story of Virginia, is her most successful novel. She portrays her characters vividly, and the spirit of the times with which the story deals is well sustained. Her novels include *Audrey; The Long Roll,* a war story; *Cease Firing,* and *The Witch.*

JOHNSTOWN, N. Y., the county seat of Fulton County, is a town in the east central part of the state, whose supporting industry is the manufacture of gloves. It is forty-eight miles northwest of Albany and is near Gloversville, another glove-making city. It is on Cayadutta Creek and on the Fonda, Johnstown & Gloversville Railroad and has an interurban line to Schenectady. The area is three and a half square miles. In 1910 the population was 10,447; by the state census of 1915 it was then 10,688.

The historical landmarks of the city are of great interest. One of them, Johnson Hall, the only baronial hall left standing in the United States, is a fine old building, once the home of Sir William Johnson. It was erected by him in 1762. One of the two stone blockhouses which stood on either side still remains. The building is now owned by the state and is a museum of colonial relics. The Drumm House, the old jail and the county courthouse were built by Sir William, the first in 1763, the last two in 1772. The courthouse is still in use, and court sessions are announced by the ringing of the old original triangle. Sir William Johnson, who directed the settlement of a colony of Scots at this place in 1760, and for whom the town was later named, was the British Governor of Indian Affairs, and his home was the scene of many conferences with the Indians.

The prominent buildings are the city hall, Federal building, Y. M. C. A. building and Carnegie Library. Johnstown is one of the most important glove-making cities in the United States and employs over 3,000 workers in this industry. Other manufactures are mittens, knit underwear, leather, baseballs, glovemakers' tools, fur coats, etc.

In 1808 Johnstown was incorporated as a village, and in 1895 was chartered as a city.

JOHNSTOWN, PENN., a manufacturing city in Cambria County, in the southwestern part of the state, seventy-five miles east and south of Pittsburgh. It is situated at an altitude of 1,200 feet, and occupies an area of five square miles in a deep, level valley in the western hills of the Alleghany Mountains, at the junction of Little Conemaugh and Stoney Creek, which continue as the Conemaugh River. It is served by the Pennsylvania and the Baltimore & Ohio railroads and by interurban electric lines. The population increased from 55,482 in 1910 to 68,529 (Federal estimate) in 1916. Russians predominate among the twenty-six per cent who are foreign born.

Johnstown is the center of a rich bituminous coal region; in Cambria County there are more than two hundred mines. Here also are found iron ore, fire clay and limestone, extensively used in manufacture. The value of manufactured products annually exceeds $50,000,000. One steel company employs 17,000 men, and makes a great variety of steel goods ranging from wire brads to steel freight cars. Among many industries is a second large iron and steel plant, extensive manufactures of radiators, stoves, fire clay products, furniture, paints, and wall and tar paper.

The city has several small public parks, a Federal building, city hall, Cambria Free Library, a Y. M. C. A. building, erected at a cost of $300,000 and housing an organization of 2,600 members, Memorial, Mercy and City hospitals, and Cambria Hospital for employees. The city has a number of parochial schools.

Grand View Cemetery is the burial place of 800 victims of a great flood which occurred here on May 31, 1889. Conemaugh Lake, twelve miles east of the city, a body of water two and one-half miles long, one and one-half miles wide and averaging fifty feet in depth, swollen by heavy rains, burst a retaining dam and released an enormous body of water which in a short time flooded the valley, practically destroying the city. More than 2,200 lives were lost, and the property destroyed was valued at $10,000,000. Every part of the United States shared in the $3,000,000 in money and supplies sent to relieve suffering and rebuild the city.

Johnstown was settled in 1791 and became a city in 1889. The commission form of government was adopted in 1912. In 1916 the construction of a sanitary sewerage system to cost $1,500,000 was commenced. J.K.J.

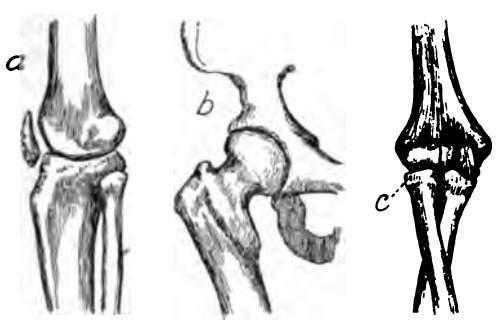
JOHORE, *jo hohr',* a small state 9,000 square miles in area in the southern part of the Malay Peninsula. It is under the control of Great Britain, but is practically independent because of the wise management of the native sultans. Of the 200,000 (estimated) inhabitants there are a great many more Chinese than Malays. Johore is only 100 miles north of the equator, but the climate, moderated by the waters of

the China Sea, is pleasant and healthful. The surface of the country is broken by a few hills, the highest, Mount Ophir, being 4,186 feet above the sea. The land is densely wooded and tropical fruits grow plentifully. Johore Bahru, the capital, is a city of about 20,000 inhabitants, and is sometimes called the "Monte Carlo of Asia." It is much visited by the people of Singapore, fifteen miles farther south, whose climate is much warmer. Johore has one railroad, connecting with a main line about 120 miles farther north. The exports, rubber, coffee, black pepper, gambier, gutta-percha and sago, yield the state a large revenue.

JOINTS, which are formed by the meeting of two bones, are chiefly for the purpose of making the limbs and other parts of the body flexible and affording freedom of movement. They are an important factor in the countless acts that one performs every day. In regard to their structure, joints are said to be *immovable* and *movable.*

Immovable Joints. These are placed where the bones are almost directly in contact with each other, separated only by a thin layer of connective tissue. Examples are the joints connecting the bones of the skull. Ordinarily these joints are stationary, but in case of accident they may move enough to prevent the breaking of a bone. The cranium joints therefore help protect the brain, one of the most delicate organs of the body.

Movable Joints. The movable joints are found for the most part in the limbs, and are divided into three classes. *Hinge joints* are



JOINTS

(*a*) Hinge joint; (*b*) ball and socket joint; (*c*) pivot joint.

those which permit a forward and backward motion in one plane, like the motion of a door on its hinges. The joints at the elbow and knee and the last two joints of the fingers are typical examples. *Pivot joints* give the movement of rotation, such as the motion of the head in turning from side to side. The joints which allow the greatest freedom of movement are the *ball-and-socket.* Important examples are those at the hip and the shoulder. In each case there is an enlarged and rounding end of a long bone (ball) fitting into a hollow of another bone (socket). The arms have a greater range of motion than the legs because the shoulder socket is more shallow than the hip socket, but the shoulder is more easily dislocated, that is, "put out of joint."

Movable joints are safeguarded in several ways. Wherever two bones glide over one another there is a layer of elastic cartilage, or gristle, on the end of each bone (see CARTILAGE). Ease of movement is secured by the smoothness of the cartilage, and its elasticity serves to break the force of sudden jars. All movable joints are supplied with a lubricating substance called *synovial fluid,* which keeps the cartilages smooth and prevents the bones from feeling the wearing effects of constant movement. Bones are held in place at the joints by strong ligaments, which are fastened to the bones above and below the joint. At the hip there is a collarlike set of ligaments which form a *capsule* about the joint.

Joints are subject to sprains and dislocations. A sprain (which see) occurs when the ligaments about a joint are torn or badly stretched. Serious sprains are extremely painful and if neglected may result in stiffening of the joints. Dislocated joints should have the attention of a physician, that the bones may quickly be put back in place.

The painful disease popularly known as rheumatism often settles in the joints, and the chronic form of this ailment usually cripples the patient. Gout is a painful disease of the joints. See GOUT; RHEUMATISM. S.C.B.

JOINTS, in geology, are the cracks which separate rocks into more or less regular blocks. They are usually parallel and in systems, so the rock seems to be divided as evenly as though the work had been done by an architect. Basaltic columns of trap rock form excellent illustrations of such divisions. Joints are usually caused by earthquakes, and the fracture of rocks from cooling or drying. They may affect the drainage of the region and also the flow of springs by stopping or changing the outlet. This is why an earthquake sometimes causes some springs to dry up and new ones to break forth.

JOINT STOCK COMPANY, in Great Britain, Canada and the other British dominions, cor-

responds to the *corporation* in the United States. A Canadian company may be chartered either by the Dominion or by a provincial government. If the liability of individual members is limited to the amount of their investments, the word *Limited* is a part of the company's name, and must be used in all documents and advertisements. See CORPORATION.

JOKAI, *yo'kah e,* MAURUS (1825-1904), an Hungarian novelist whose works, which include almost 300 volumes, present a splendid panorama of the political and social life of his country during the nineteenth century. His writings embrace novels, romances, dramas, humorous essays and poems. He gained fame, too, as the editor of a revolutionary weekly, a political daily and a humorous weekly. He was a prominent figure in the Hungarian revolution of 1848, and the entire revolutionary period, as well as his own imprisonment and escape, furnished the settings and plots for many of his best-known novels. Among these are *The Hungarian Nabob, The New Landlord, Black Diamonds, The Modern Midas, The Comedians of Life* and *God is One.* He also wrote a *History of Hungary* which is held in high repute, and the dramas, *King Koloman* and the *Martyrs of Szigetvar.* His skill as a narrator is enhanced by a vivid imagination, a great sense of humor and an intimate knowledge of Hungarian life.

JOLIET, *jo'li et,* ILL., a busy manufacturing city in the northeastern part of the state, about forty miles southwest of Chicago. It is the county seat of Will County, and is situated on the Des Plaines River and on the Illinois and Michigan Canal. The Chicago, Rock Island & Pacific, the Chicago & Alton, the Atchison, Topeka & Santa Fe, the Michigan Central and two local lines provide transportation facilities; these afford connections with thirty-nine trunk lines, operating from Chicago. An electric system links Joliet with cities in Indiana, Ohio, Wisconsin, Missouri and Illinois. The first permanent settlement was made in 1831; it was incorporated as a city in 1845 and named for Louis Joliet, who with Marquette visited the locality in 1673. The commission form of government, with five elective officers, was adopted in 1915. In 1910 the population was 34,670; it increased to 38,010 by 1916 (Federal estimate); about seventy-five per cent of these are Americans. The area is about four square miles.

Joliet is so extensively engaged in the manufacture of steel products that it is locally known as *The Steel City.* The steel and wire mills employ about 8,000 men; the steel works and the coke ovens, consequent upon the steel industry, rank with the largest plants of their kind in the United States. Manufactures are largely promoted by the water power furnished by the river and canal. Besides the steel mills there are important manufactories of stoves, boilers and agricultural implements. Several thousand people are employed in the large quarries of Silurian limestone, called Joliet limestone, which is found in the vicinity.

The most notable building of the city is the state penitentiary, an imposing structure built of Joliet limestone. Others worthy of note are a $200,000 Federal building erected in 1892; a $140,000 public library, with over 15,000 volumes, and the township high school, which is not surpassed by many larger cities. In addition to the public schools there are Saint Mary and Saint Francis academies and a business college. The Illinois Steel Company Athenaeum was established for the benefit of the employees of the company. It contains a library of 7,000 volumes, billiard rooms, bowling alleys, a swimming pool, baths and an entertainment hall. West Park, Highland Park and Delwood Park are the amusement and recreation grounds of the city. Joliet is the residence of a large number of people who have business interests in Chicago.

JOLIET, *zho lya',* LOUIS (1645-1700), a Canadian explorer who gave the world its first definite knowledge of the Mississippi River. He was educated for the priesthood in the Jesuit College at Quebec, his native city. He was always fond of adventure and early in life made several expeditions to the head of the Great Lakes. In 1672, Joliet and Father Jacques Marquette, with six other companions in two birch-bark canoes, set out to trace the course of the Mississippi. They ascended the Fox River, crossed the portage to the Wisconsin, sailed down that stream, and entered the Mississippi, following its windings southward to a point not far from the mouth of the Arkansas. Satisfied that the Mississippi emptied into the Gulf of Mexico, and not into the Pacific Ocean, as had been generally believed, they returned to Quebec by way of the Illinois river and Lake Michigan. Although Joliet lost all his charts during this expedition, he was able from memory to draw a map of the discoveries he had made. He was presented with the island of Anticosti, where he built a fort. In 1697 he was given sovereign

rights of Joliet, south of Quebec, which is still the possession of his descendants.

JOLIETTE, *zho lyet',* the county town of Joliette County, Quebec, situated in the southern part of the province and on L'Assomption River. Montreal is thirty-six miles south and Quebec is 140 miles northeast. Transportation is offered by the Canadian Pacific and Canadian Northern railways. Joliette is the center of a large agricultural section. Facilities for manufacture are increased by the water and electric power provided by the Joliette Falls on L'Assomption River and Shawinigan Falls on the Saint Maurice River. There are five tobacco factories, woolen, lumber, grist and paper mills, clothing and biscuit factories and breweries; the repair shops of the Canadian Northern Railway are located here. The prominent buildings are the Dominion building, which cost $80,000, the courthouse, city hall, the Roman Catholic cathedral, the bishop's palace and a hospital. Besides the public and parochial schools, Joliette has a seminary and a convent for girls, and Saint Viateur College for boys, the first school of the Order established in Canada. The place was settled in about 1840 by Barthelemy Joliette, in whose honor it was named. In 1863 it was incorporated as a city. The population in 1911 was 6,346; in 1916 it was estimated at 7,000.

JOLY DE LOTBINIÈRE, *zho'le de loht be nyar',* Sir Henri Gustave (1829-1908), a Canadian statesman, for many years the leader of the Liberals in Quebec. He was born at Epernay, France, where his father owned famous vineyards. His mother, Julie de Lotbinière, was the granddaughter of Eustache de Lotbinière, one of Montcalm's engineers at Quebec. It was therefore doubly fitting that Henri Gustave Joly, after living in the county of Lotbinière, Que., and representing it in the old Canadian assembly should assume the name De Lotbinière; this he did in 1888.

After coming to Canada as a boy with his parents young Joly spent five years in the study of law, and in 1855 was called to the bar of lower Canada. A few years later, in 1861, he entered political life as a Liberal member of the assembly. Like Sir A. A. Dorion, he opposed Confederation, in the belief that the rights of the French-Canadians would not be sufficiently protected. After Confederation he was the acknowledged leader of the Quebec Liberals, and sat both in the Quebec assembly and in the Dominion House of Commons until 1874. In that year, when dual representation was abolished, Joly retired from the House of Commons, but continued to lead his party in the assembly. In 1874 and again in 1877 he declined appointment to the Dominion Senate, and in the latter year also declined the Ministry of Agriculture in the Mackenzie government.

From March, 1878, to October, 1879, Joly was premier of Quebec. His administration was notable for its efforts to economize and to reëstablish the provincial finances on a sound basis. From 1879 to 1883 Joly was leader of the opposition in the assembly, and in 1885 he retired from public life as a protest against his party's attitude toward Louis Riel. Ten years later, in response to appeals from his party, he took an active part in the campaign, and at the elections of 1896 was again returned to the House of Commons. He at once became controller of inland revenue in the Laurier government, and in 1897 was given a seat in the Cabinet as Minister of Inland Revenue. From 1900 to 1906 he was lieutenant-governor of British Columbia. Queen Victoria created him Knight Commander of the Order of Saint Michael and Saint George in 1895. G.H.L.

JONAH, *jo'na,* a Hebrew prophet who figures in one of the best known of Old Testament narratives. According to the story as given in the book of *Jonah,* he was commanded by God to go to the Assyrian city of Nineveh, to warn the people there that they were doomed to punishment because of their sins. Disobeying the Divine will, he went to Joppa and boarded a ship bound for Tarshish. During the voyage a great storm lashed the sea into mighty waves, and the frightened sailors, thinking that this upheaval was due to some evil person on board, cast lots to see who was the cause of their peril. The lot fell to Jonah, who was cast into the raging sea. As soon as this was done the storm ceased, and as the disobedient prophet sank into the waves it is said he was swallowed by a great fish which God had sent for his deliverance.

At the end of three days and nights, during which the repentant Jonah lay within the fish praying to God to save him, the prophet was cast forth upon dry land. When God a second time directed him to go to Nineveh he obeyed, and so earnestly did he preach to the people that they repented. Jehovah therefore forgave them, and so Jonah's prophecy, that in forty days their city would be destroyed, was not fulfilled. Jonah, instead of being pleased, was greatly disappointed, for he thought the people

would consider him a false prophet. Accordingly, he left the city in a state of utter dejection, and it was only after much suffering of mind and body that he came to see the beauty of God's mercy to a misguided people. The historical accuracy of the *Book of Jonah* has long been a subject of controversy, but nearly all modern critics regard the story as an allegory or parable.

JONES, ALFRED GILPIN (1824-1906), a Canadian statesman, once a leading member of the Liberal party, a man whose fame has been obscured by that of his greater contemporaries. Jones was a native of Nova Scotia, whose entrance into the Confederation he strongly opposed. Just after the passage of the British North America Act, when the British government refused to repeal it, Jones made a fiery speech which won for him the name of Haul-down-the-Flag Jones and caused his loyalty to be questioned by his political opponents. After 1867 Jones was for many years a member of the House of Commons, and it was largely owing to his influence that the Liberal party refused in 1878 to abandon its policy of free trade, a position which led to its defeat. From 1900 until his death he was lieutenant-governor of his native province. G.H.L.

JONES, HENRY ARTHUR (1851-), an English playwright and essayist. He was born, a farmer's son, at Grandborough, Buckinghamshire, and was forced to leave school when barely thirteen years old. By his own efforts he obtained an education, and in 1879, when only twenty-eight, he attracted the attention of London with his first play, *The Clerical Error*. He has a gift for writing social dramas, usually comedies, and his plays move by bright, clever dialogue. His works have been remarkably popular both in England and America, and several of them have been translated and played on the Continent. Some of the best-known plays are *Saints and Sinners, The Liars, Mrs. Dane's Defense, Whitewashing Julia, The Hypocrites, Mary Goes First* and *The Lie*. He also published a collection of essays and lectures entitled *The Renascence of the English Drama*.

JONES, JENKIN LLOYD (1843-), an American clergyman of the Unitarian faith, general secretary of the World's Parliament of Religions of 1893, and leader in educational and philanthropic enterprises. He was born at Llandyssil, Cardiganshire, South Wales, and came to America with his parents in childhood. In 1870 he was graduated from the Meadville (Pa.) Theological Seminary. During the American War of Secession he served in a Wisconsin regiment for three years, and from 1874 to 1883 was pastor of All Souls' Unitarian Church in Jonesville, Wis. For nine years he was secretary of the Western Unitarian Conference, and in 1883 became pastor of All Souls' Church, Chicago, which was later merged with other religious and educational enterprises into Abraham Lincoln Center, an institutional church of the broadest type. Over this he presides.

Since 1879 Dr. Jones has edited *Unity*, an organ of the Congress of Religions. In 1893 he was general secretary of the Congress of Religions, held in Chicago in connection with the World's Fair. He is president of the Tower Hill Summer School of Literature and Religion, a lecturer in English in the University of Chicago, and was a founder and first president of the Chicago Browning Society. He is a powerful lecturer, and has exerted much influence upon American educational, social, political and religious life by his addresses and sermons. His published works include *Practical Piety, The Faith that Makes Faithful, Bits of Wayside Gospel* and *On the Firing Line in the Battle for Sobriety*, the latter published in 1910. During the War of the Nations he accompanied the Ford peace mission to Europe (see FORD, HENRY).

JONES, JOHN PAUL (1747-1792), a dauntless sea rover, who offered his services to the United States in the Revolutionary War. He was appointed commander of the flagship *Alfred* in 1775, was the first to raise the Stars and Stripes on a United States ship-of-war, and in 1777, when he sailed to Europe on the *Ranger*, he received the first salute ever given by a man-of-war to the newly-adopted American flag.

JOHN PAUL JONES

He was born in Kirkcudbrightshire, Scotland. His name originally was JOHN PAUL, but out of gratitude to Willie Jones of North Carolina for friendship and support, he assumed the latter's name. He followed the sea, speedily became a merchant captain, but was accused of killing one

of his men. When he invaded British waters in 1777 in command of the *Ranger,* he took advantage of his familiarity with the scenes of his boyhood to make a hostile cruise along the shore of the Solway Firth and landed and attempted to burn Whiteham.

In 1779, as commander of the *Bon Homme Richard,* he captured the British sloop-of-war *Serapis,* after one of the most desperate and spectacular of the world's sea fights. The *Bon Homme Richard* and *Serapis* drew so close to each other that their rigging became entangled and Jones attempted to board the British ship. After a short fight Jones was repulsed and the vessels separated, but remained so close together that the muzzles of their guns touched. Both vessels caught fire, and after a terrible hand-to-hand encounter the tall mast of the *Serapis* fell, and Pearson, commander of the vessel, surrendered. For this victory Congress gave Jones the nation's thanks, a gold medal and a commission as commander of the *America,* a ship-of-the-line which was presented soon afterwards to France. The French king made Jones a knight of the Order of Merit.

Captain Jones (for he never received a higher title from the United States) was destined for other command, but the Peace of 1782 put an end to that opportunity. In 1787 he entered the service of Russia as rear-admiral, and was made vice-admiral and was knighted after a victory over the Turks. He resigned from the Russian army and was appointed consul of the United States at Algiers in 1792, but died before the commission reached him. His death occurred in Paris on July 18, 1792. In July, 1905, his burial place was discovered beneath a four-story building in that city, and by consent of France his body was brought to the United States by a squadron of battleships and interred at Annapolis. A.B.H.

Consult Brady's *John Paul Jones,* in the Great Commander's Series; Taylor's (editor) *Life and Battles of John Paul Jones, Written by Himself.*

JONES, SAMUEL PORTER (1847-1906), a Methodist minister, popularly known as SAM JONES, who was for years a picturesque figure in evangelistic work throughout the United States. He was born in Alabama, where he began his career as a successful lawyer. Having ruined his prospects through his craving for drink, he sought the help of religion, was converted, and in 1872 was ordained as a minister of the Methodist Episcopal Church, South. As an evangelist and Chautauqua lecturer he became widely known for his unconventional and witty sayings. His characteristic habits of speech are suggested by the titles of various books published by him; among these are *Sermons and Sayings by Sam Jones, Music Hall Sermons, Quit Your Meanness, Sam Jones' Own Book* and *Lightning Flashes and Thunderbolts.*

JONQUIL, *jon'kwil,* a delicate, sweet-scented, yellow species of narcissus, native to Southern Europe and Northern Africa, but cultivated in other countries. From bulbs planted in autumn, four inches deep in well-drained, rather rich soil, foot-high flower-stalks appear, which in April bear clusters of three to six dainty flowers. Each consists of an inch-long yellow tube, surrounded by yellow petals. Most species are sweetly fragrant, and are used in the manufacture of perfume. The flower-stem is leafless, but glossy, dark green leaves, very narrow and rushlike, spring from the ground and surround each stalk of flowers. The name jonquil is from the Latin *juncus,* meaning *rush,* and was suggested by the shape of the leaves. The trumpet daffodil is often incorrectly called jonquil. Jonquils are readily grown in conservatories for January blooming. See DAFFODIL; NARCISSUS.

THE JONQUIL

JONSON, BEN (about 1573-1637), an English dramatist and lyric poet, the friend of Shakespeare and one of the commanding figures among the writers of the Elizabethan Age. The world's estimate of him is chiseled in four words on his tomb in Westminster Abbey—"O rare Ben Jonson."

Of all the Elizabethan dramatists he alone adhered to the standards of the Greek and Roman classics, and he fought unflinchingly though unsuccessfully against the romantic tendency of the period. His plays are historically accurate, even in the smallest details, and are logically constructed, and his characters are presented with extraordinary realism. Jonson was born at Westminster, was educated at Westminster Grammar School, and, according to an unsupported tradition, at Cambridge Uni-

versity. After leaving school he was set to learning the brickmaker's trade, but tiring of this occupation he ran away and joined the English army which was fighting the Spaniards in the Netherlands. There he distinguished himself by killing a soldier in a duel, both armies watching the combat from the lines. On his return to England he began a theatrical career as an actor and reviser of old plays, like his celebrated contemporary, Shakespeare.

"O RARE BEN JONSON"

Jonson's first important play, *Every Man in His Humor,* written to ridicule the city life of his day, was presented in 1598, one of the parts being played by Shakespeare. Numerous other dramatic works followed, and his masques (dramatic spectacles in which the characters are mythological personages) so pleased King James I that he appointed the author poet laureate in 1619. His life on the whole, however, was stormy, for he quarreled with nearly all his literary friends, and he was nearly hanged at one time for killing an actor in a duel. There is a tradition that Shakespeare died from the effects of a fever contracted while he was entertaining Jonson and a fellow-poet, Michael Drayton, at the Stratford Tavern. Jonson himself outlived his famous friend twenty-one years, and though he died in poverty he was buried with great honor in Westminster Abbey.

Jonson's work as a dramatist is best represented by three satires, *Every Man in His Humor, Cynthia's Revels* and *The Poetaster;* the comedies *Volpone, or the Fox, the Alchemist,* and *Epicoene, or the Silent Woman;* and the tragedies *Sejanus* and *Catiline. The Sad Shepherd,* a pastoral poem of great beauty, was left unfinished at his death. Modern readers remember him best for his little poems and songs, such as the one beginning:

Drink to me only with thine eyes,
And I will pledge with mine;
Or leave a kiss but in the cup
And I'll not look for wine.
The thirst that from the soul doth rise
Doth ask a drink divine,
But might I of Jove's nectar sup,
I would not change for thine.

JOP'LIN, Mo., the county seat of Jasper County, is a commercial city whose principal industries center about zinc and lead ores products. It is situated in the extreme southwestern part of the state, within four miles of the western state line, 154 miles south of Kansas City and ninety-three miles west of Springfield. It is on Shoal Creek, and on the Frisco Lines, the Atchison, Topeka and Santa Fe, the Kansas City Southern, the Missouri & North Arkansas, the Missouri, Kansas & Texas, the Missouri, Oklahoma & Gulf and the Missouri Pacific railroads. Two interurban electric lines connect with more than forty towns. The population, almost entirely American, was 32,073 in 1910 and 33,216 in 1916 (Federal estimate). The area of the city is nearly sixteen square miles.

A Federal building, erected in 1904 at a cost of $100,000, a courthouse, Carnegie Library, Y. M. C. A. building, opera house and banks, hotels and churches are among the prominent buildings. There are five parks containing about 340 acres. The schools include public and parish schools, business colleges and the Academy of Our Lady of Mercy.

Joplin is centrally located in one of the richest zinc and lead regions in the world. About 14,000 miners are employed in the operation of nearly 450 mining plants in this district, whose output of zinc and lead ores in 1914 was valued at $28,000,000 (see ZINC; LEAD). The chief industrial enterprises of the city are smelting, paint and white lead works, foundries and machine shops. It is the trade center of a large and fertile agricultural and fruit-growing section.

In 1871 Joplin was incorporated as a town, and in 1888 was chartered as a city. In 1914 the commission form of government was adopted. F.L.Y.

JORDAN, a river in Palestine whose name is associated with some of the most vital events of the dead past. To the Church it will always remain of peculiar interest because along its course and in its valley to westward the Christian religion struggled through its foundation years. Rising in the northern mountain springs of Palestine, it makes a sharp descent and flows for most of its 200 miles below sea level. It winds in and out through a deep valley, called the Ghor, emptying into the Dead Sea, whose surface is about 1,300 feet below the Mediterranean.

In the short distance of ten miles from Lake Merom to the Lake of Tiberias, better known

as the Sea of Galilee, the river falls 689 feet, so many rapids and whirlpools are formed, making navigation impossible; along the rest of its zig-zag journey the water is not more than two or three feet deep, except at the flood season in March. Then the melting snows from Mount Hermon often flood the little river valley, called the Zor, which is from one-half to two miles wide and lies in the center of the larger valley. Two bridges, one below Lake Merom, over which the road passes from Damascus to Galilee, and the other below the Lake of Tiberias, have been built across the stream.

COURSE OF THE JORDAN

The Jordan was the river over which Joshua led the Children of Israel into the Promised Land (see *Joshua* III, 1-17), and in its waters Christ was baptized by John the Baptist. Today thousands of pilgrims, chiefly Russians, journey every year from their own country to bathe in its waters and carry away their bathing garments to be buried in.

JORDAN, DAVID STARR (1851-), American educator, naturalist and advocate of world peace, was born at Gainesville, N. Y. He entered Cornell University in 1868, and before his graduation in 1872 served for a year as instructor in botany at that institution. He taught biology successively at Lombard University, the Indianapolis high school and Butler University, and in 1879 became professor of zoölogy at Indiana University, of which he was made president in 1885. In 1891 he resigned to accept the presidency of the newly established Leland Stanford Jr. University at Palo Alto, Cal., which under his administration attained high rank among American institutions of higher learning. He resigned the active presidency in 1913, and was made chancellor, that he might devote time to teaching the world the horrors and economic waste of war. From 1910 he was chief director of the World Peace Foundation, and in furtherance of its plans was in Europe at the time of the outbreak of the War of the Nations in 1914. In 1917 he exerted himself to the utmost to prevent a declaration of war on the part of the United States against Germany.

DAVID STARR JORDAN

Meanwhile, from 1877 to 1891 and from 1894 to 1909, he had been assistant to the United States Fish Commission, and had served as United States commissioner in charge of the fur seal and salmon investigations in 1901 and 1903. His works, which are numerous and of great importance, include *A Manual of Vertebrate Animals of the Northern United States, Fishes of North and Middle America, Footnotes to Evolution, The Story of Matka, The Blood of the Nation, Food and Game Fishes of North America, Fishes* and *The Stability of Truth.*

JOSEPH, *jo'zef* (1700-1590 B.C., Biblical chronology), the Hebrew lad who was sold into Egypt by his brethren and became the great prime minister of Pharaoh. The story of Joseph is one of the most interesting story-dramas of all time, and is powerfully told in the book of *Genesis.* He was the eleventh of the twelve sons of Jacob, who was ninety years of age when the boy Joseph, destined for great things, was born. To the aged father this son was the dearest of all his children, dearer even than the youngest, Benjamin. As the years passed by Joseph made a practice of going with his elder brothers into the fields to help them tend the flocks. One day, when he was seventeen years old, he appeared among them in a coat of many colors, the gift of his father. Now in those days such a garment was a mark of distinction, and the hearts of the older brothers were filled with bitterness and jealousy that so young a lad should be thus honored in preference to one of them.

Then something happened which turned their jealousy into hatred. Joseph told them about two wonderful dreams of his—prophetic visions of his future power as a great ruler. He said he dreamed that he was binding wheat in a field with his brothers, when suddenly his sheaf

stood upright, while the sheaves of his brothers gathered round and bowed down to it. In the second dream it appeared to him as if the sun, moon and eleven stars bowed down to him.

So one day, while the brothers were watching their flocks in the pastures of Dothan, they saw Joseph in the distance coming towards them, and one of them said, "Behold, this dreamer cometh. Let us slay him." But Reuben, who was not so cruel, urged them to put him in a deep pit without harming him. To this they finally agreed, after taking his beautiful coat from him. Soon after, as they were eating, a band of Ishmaelites suddenly appeared with their camels laden with spices and precious things which they were carrying from Gilead down into Egypt. Upon Judah's suggestion the brothers, during Reuben's absence, drew Joseph out of the pit and sold him to the Ishmaelites for twenty pieces of silver. The brothers killed a kid, rent the coat, stained it with the kid's blood and took it to Jacob, telling him that a wild beast had destroyed Joseph. The old man said that he should go down to his grave weeping for his son.

A Slave in Egypt. The band of Ishmaelites carried Joseph to Egypt, where Potiphar, the captain of Pharaoh's guard, bought him. Here he served his master so faithfully that he was made overseer of the household; but he offended Potiphar's wife, and she had him imprisoned upon false accusations. He soon obtained the confidence of the jailor, who placed him in charge of all the prisoners.

It happened that Pharaoh's chief butler and baker offended their lord, so they also were cast into prison. One night they both had strange dreams which Joseph interpreted correctly for them, for he told the butler that in three days he would be freed, while the baker was to be hanged at the same time. Before the butler left the prison Joseph asked him to try to obtain his pardon, but he forgot him completely until two years later, when Pharaoh had two very strange dreams which no one could interpret. Then Pharaoh, upon being told about the dreams in prison, sent for Joseph to come to interpret his dreams. The first was that seven fat kine—that is, cattle—were grazing in a field near the river when seven lean kine came and ate them up; the second was of seven good ears of corn which sprang up, but were devoured by seven thin ones. Joseph said that both these dreams meant that there would be seven years of plenty in Egypt followed by seven years of famine, and he advised Pharaoh to choose some wise man to gather in the extra food from the land of Egypt during the time of plenty, so the people could be fed when the famine came.

The Prime Minister. Pharaoh was so pleased with Joseph's sense and wisdom that he chose him as the man to oversee the storing of corn and grain, making him ruler over all of Egypt. For seven years there were abundant crops in all lands and Joseph carefully watched over Egypt, so when the famine suddenly spread over all the known world his country was not in want.

Up in Canaan no grain had been saved, so Jacob and his family soon were much in need of food, and the ten oldest sons were sent down into Egypt to buy corn. Of course they did not recognize their brother Joseph when they were brought before him, for it was twenty years since they had sold him into slavery. Joseph, however, knew them immediately, for some of the older ones had changed but little. Pretending to think that they were spies, he asked them about their home, and when they said that they had another brother, Benjamin, at home, he told them to go and get him to prove what they said was true. As they left he ordered their bags to be filled with corn, and the money which they had paid hidden in the bags, while he kept one brother, Simeon, as hostage until they returned.

When the old father Jacob heard the things his sons told him he refused at first to let Benjamin go back with them, but after all the corn had been eaten he was obliged to let the brothers take the boy with them on their return for more food. As Joseph saw Benjamin he longed to take him in his arms and weep for joy, for Benjamin was his own brother, the son of Rachel, Joseph's mother, while the others were all half-brothers. But instead, he did not tell any of them who he was until he tested their character. Then when he found how thoughtful they were of their father, he sent the servants from the room and told all about himself.

The brothers were ashamed to look at him, but Joseph told them that he forgave them for their wickedness. After this happy reunion, he told them to go and bring their father, with all their families, down into Egypt, where they could have plenty of food for themselves as well as for their cattle. When Pharaoh heard the good news he gave them wagons and provisions sufficient to last until they could return to Egypt.

Settling His Family in Egypt. At first Jacob could not believe that his son Joseph still lived and was a great ruler in Egypt, but when he saw the wagons sent to carry all his family into the new land, he said, "It is enough, Joseph my son is yet alive; I will go and see him before I die." So all of his children and grandchildren and even great-grandchildren loaded their things into the wagons and journeyed to the land of Goshen, where Joseph met them.

When Joseph told Pharaoh that his people had come, he asked what their occupation was, and as soon as he found that they were shepherds he told them to settle right where they were, for it was a rich country. So Jacob blessed Pharaoh for his kindness and lived for seventeen years in the new home. Joseph lived to be 110 years old.

Joseph had two sons, Ephraim and Manasseh, who became the fathers of the half tribes of Israelites that bore their names. This story tells us how the Israelites were led into Egypt where, after Joseph's death, later Pharaohs made them slaves. E.C.

JOSEPH, the husband of Mary, the mother of Jesus, was a carpenter in Nazareth. Being a descendant of David, he had to go to Bethlehem for enrollment according to the decree of the Emperor Augustus, so he was there with his wife when Jesus was born. Warned by an angel in a dream that Herod wished to murder the baby, Joseph took his small family to Egypt, but they returned to Nazareth soon after they heard of Herod's death. Once a year he went to Jerusalem with Mary to attend the Feast of the Passover, and when Jesus was twelve years old they took him with them. Little is known concerning Joseph from this time on, although he probably lived until the beginning of Jesus' public ministry. At the time of the Crucifixion Jesus asked John to care for his mother, so Joseph must then have been dead.

JOSEPHINE, *jo'zef een,* MARIE ROSE (1763-1814), wife of Napoleon Bonaparte, and therefore empress of the French, was one of the most pathetic figures in modern history. When she was seventeen years old she married Viscount Alexandre Beauharnais. Two children were born to them—a son, Eugene, and a daughter, Hortense. The husband was one of the last victims of the Reign of Terror, and after the fall of Robespierre Alexandre Beauharnais was led to the guillotine. Eugene, the young son of Josephine, presented himself before Bonaparte, then in command in Paris, and begged for his father's sword, which had been taken from him when he was imprisoned. The general gave the boy the sword, when, to his surprise, the boy burst into tears and kissed it. The next day the boy's mother called on Napoleon to thank him for his kindness to her son; Bonaparte fell in love with her immediately, pursued and courted her persistently and later married her.

THE EMPRESS JOSEPHINE

When Bonaparte was made First Consul Josephine was invaluable to him, and later, when the Consulate became the Empire, she conducted herself with tact and grace. Shortly after the marriage of Napoleon and Josephine the former purchased a little estate near Paris, called Malmaison, for his wife, and Josephine spent her happiest days there. When Napoleon was crowned Emperor, and Josephine's time came to take part in the greatest drama of modern times she descended from the throne and advanced to the altar of the Cathedral where the newly-crowned emperor awaited her. He took the little crown in his hands, placed it on his own head, then on hers, lifting it off once or twice in a playful manner, as if to assure her that she should wear it lightly.

The question of the succession to the throne became a grave one to Napoleon. He feared that if he died without issue the splendid organization which he had created would be destroyed. He decided to divorce Josephine. After dinner one evening he made his decision known to her, as gently as he could. Josephine's little boudoir was the scene of the final chapter of the great tragedy. It was here that the last good-byes were said. The empress begged her husband not to forget her. She promised to follow his wishes in caring for her health, to turn a deaf ear to any gossip concerning him, and never to doubt his love. She spent the few remaining years of her life at Malmaison. On March 12, 1810, Napoleon married Marie Louise, daughter of the Emperor of Austria. A year later, when the long-desired

heir to the French throne was born, and Josephine heard the cannon which announced the birth of a son, she called her people together and said: "We, too, must rejoice. I will give you a ball, and the whole city shall be glad with us." Soon after, without Marie Louise's knowledge, Napoleon carried the babe to Malmaison to Josephine, who had begged to see him.

When Napoleon was exiled at Elba Marie Louise refused to join him, and when Josephine heard of it she wrote Napoleon, begging to be permitted to come to him. He was obliged to deny her request, but before his answering letter reached Malmaison Josephine had died. See NAPOLEON I. E.D.F.

Consult Meneval's *The Empress of the French* (translation by Fraser); Abbott's *History of Josephine.*

JOSEPH OF ARIMATHAEA, a Jewish believer in Jesus who went boldly to Pilate after the crucifixion to beg for the body of his Lord, that he might lay it in his own new tomb which he had hewn out of a rock (*Matthew* XXVII, 60). Joseph was a member of the Sanhedrin, the chief governing body in the Temple. Though he did not consent to the resolution to put Jesus to death, he was afraid to say too much publicly in His favor.

JOSEPHUS, *jo se'fus,* FLAVIUS (37- ?), whose real name was JOSEPH BEN MATTHIAS, was a Jewish historian, born in Jerusalem. He was of royal and priestly descent and related to the Maccabean house (see MACCABEES). On account of the ease, elegance and accuracy of his historical writings he was called *the Hebrew Livy.* Soon after the outbreak of the war between the Jews and the Romans, about the year 65, he was appointed governor of Galilee, and heroically but unsuccessfully defended that city against the Romans under Vespasian. He remained with the Roman army as a semi-prisoner for about three years, and witnessed the siege and fall of Jerusalem in A.D. 70. He then went to Rome with Vespasian, where he gained the imperial favor and adopted his Latinized name of *Josephus Flavius.* He is believed to have died during the reign of the Emperor Domitian, and, according to some authorities, as a martyr to the Jewish faith.

The familiar expression "Josephus' Works" means, generally, his *Jewish Antiquities,* a history of his countrymen from the earliest period down to the close of Nero's reign, comprising twenty books. His other authentic writings are a *History of the Jewish War,* in seven books, written both in Hebrew and in Greek, and an *Autobiography.*

JOSH BILLINGS. See SHAW, HENRY WHEELER.

JOSHUA, *josh'u a* (1537-1427 B.C., Biblical chronology), a military genius who after forty years as personal attendant on Moses in the Wilderness was divinely appointed his successor as prophet and leader of the children of Israel. To Joshua was given the task of conquering Canaan and settling his people in their new home, so upon the death of Moses he began immediate preparations for crossing the Jordan. After seven years of warfare all the thirty-nine kings who had occupied the Promised Land were subdued, and the country was distributed by lot among the Twelve Tribes, while their tabernacle was permanently placed at Shiloh (*Joshua* XVIII, 1). Near the end of his life he gathered the people together at Shechem, where he delivered a powerful address urging the people not to forsake God. He died at the age of 110 years.

The Book of Joshua, in the Old Testament, named for its author, records the events and life of the children of Israel as Joshua led them into the Promised Land after their long wandering in the Wilderness. The period covered in the book is about twenty-five years. Joshua followed the example of his predecessor in writing down the history of his people, although the concluding verses, giving his final admonitions and recording his death, were written by another, probably a member of his tribe.

JOSIAH, *jo si'ah* (647-608 B.C.), the righteous king of Judah who greatly increased the prosperity of his country, which was maintaining its standing among the kingdoms only with great difficulty. He ascended the throne at the age of eight, upon the death of his father, Amon, and four years later began a crusade against idolatry by breaking down the images of Baal. In his eighteenth year he started the work of repairing and adorning the Temple.

While this was being done, Hilkiah found the book of the law which had been lost for many years and had it read to Josiah, who was greatly impressed with the warning concerning those who did not obey God (*Deuteronomy* XXIX, 25-28). As a result another assault against idolatry was begun, and the Valley of Hinnom, where children had been burned as offerings to Molech, was defiled so that it never could be used again. Then a

ful Passover was held which was so well d and so solemn that nothing like it en celebrated since the time of Samuel igs XXIII, 1-25). Thirteen years later c.), prompted by friendship for the king yria, Josiah marched against Pharaoh who was on his way to attack that n, and at Megiddo, where the two met, he was mortally wounded.

NALISM, *jur'nal iz'm,* SCHOOLS OF, purpose is the training of men for the per profession, are now being established nection with many of the leading col- nd universities in America. Though nal lectures had been given on journal- was not until the first decade of the th century that courses of practical ere introduced. The universities of the West were the leaders in establishing courses in journalism. The University souri maintains a school of journalism nas the same standing as its schools of ie, of law and of education; the degree s that of bachelor of journalism. Many ities offer special training as a part of rk of the English department, and the s circulate a newspaper, usually a daily, ch they do all the work, including re- , editorial writing, managing, and some- even typesetting and press work. Co- University is the only Eastern school s a regular school of journalism. It was l in 1912 through the generosity of Pulitzer of the New York *World* and Louis *Post-Dispatch,* who donated for pose a fund of $2,000,000. W.W.

DE FUCA, *hwan' day foo'ka,* STRAIT waterway separating Vancouver Island he state of Washington. It connects Sound, on the south, with the Strait of

JUAN DE FUCA

, which separates Vancouver Island ie Canadian shore, on the north. The s of great commercial importance, as art of the route by which ships go from Vancouver and Victoria to the Pacific Ocean. It is about eighty miles long and has an average width of ten to eighteen miles. The shores are covered with heavy timber and are usually high and somewhat rocky.

The strait was named for Juan de Fuca, a sixteenth-century Greek navigator whose real name was Apostolos Valerianos. His claim to have discovered and navigated the strait was false, but his name remained. The island of San Juan, at the eastern end of the strait, was the cause of a long-standing dispute between the United States and Great Britain, the question being whether it should be considered a part of British Columbia or of Washington. The German emperor, who arbitrated the issue in 1872, decided that it should belong to Washington. The international boundary runs through the Strait of Haro, west of the island.

THE SELKIRK MONUMENT

The following inscription on the tablet fully explains its presence:

"In memory of Alexander Selkirk, mariner. A native of Largo, in the county of Fife, Scotland, who lived on this island in complete solitude, for four years and four months. He was landed from the *Cinque Ports* galley, 96 tons, 16 guns, A. D. 1704, and was taken off in the *Duke*, privateer, 12th Feb., 1709. He died lieutenant of H.M.S. *Weymouth*, A. D. 1722, aged 47 years. This tablet is erected near Selkirk's lookout by Commodore Powell and the officers of H.M.S. *Topaze*, A. D. 1868."

JUAN FERNANDEZ, *hwahn fer nahn' dayth,* a group of volcanic islands in the Pacific Ocean, about 350 miles west of the city of Valparaiso,

belonging to Chile, politically included in the province of Valparaiso. The two largest islands are Mas-a-Tierra and Mas-a-Fuera. Mas-a-Tierra is an island of great beauty, thirteen miles long and four miles broad, with about twenty inhabitants. Pigs, dogs, goats, cattle and horses run wild in considerable numbers, having been introduced by various colonists.

The islands were discovered in 1563 by Juan Fernandez, a Spaniard who lived on the islands for some time and stocked them with pigs and goats. The most famous resident, however, was Alexander Selkirk, whose residence there for four years (1704-1709) is said to have inspired the *Robinson Crusoe* of Daniel Defoe. The islands came into the possession of Chile at the beginning of the nineteenth century, and were for some time used as a state prison by the government of that country.

JUAREZ, *hwah'raze,* BENITO (1806-1872), twice ruler of Mexico, was born of Indian parents in Oaxaca. He had a stormy political career, but he faced his foes with the courage of his race, holding his various political positions with unwearied energy, from humble beginnings as a lawyer to the Presidency of the republic. As the Mexican government was bankrupt upon his accession, in 1861, he issued a decree suspending for two years all payments on public debts of every kind. This led to the landing in Mexico of English, Spanish and French troops. The French declared war, after the withdrawal of the first two powers, named Maximilian emperor and drove Juarez and his adherents to the northern limits of the republic, where he maintained a stubborn resistance. Under the pressure of the American government, the French withdrew in 1867, when Maximilian was captured and shot. Juarez was reëlected President in 1871. The last years of his activities were disturbed by frequent revolutionary attempts. He was always an exponent of liberal views.

The city of Juarez, Mexico, across the international boundary from El Paso, Texas, was named for him, and there is a monument to his memory in nearly every large city of the republic. See MEXICO, subtitle *History;* MAXIMILIAN.

JU'BILEE, the fiftieth anniversary of any enterprise or institution. The name and idea are borrowed from the ancient Hebrews, who proclaimed each fiftieth year a year of atonement and rejoicing. At the end of the forty-ninth year the trumpet was sounded and during the year following the lands lay fallow, slaves were set at liberty, families were reunited and lands returned to their original owners or their heirs. In the Roman Catholic Church it is the occasion of unusual spiritual privileges. The word now is very frequently employed in a sense signifying a period of merrymaking.

JUDAS ISCARIOT, *ju'das is cair'i ot,* the one of the Twelve Apostles of Jesus who betrayed his Master into the hands of the Jewish priests for thirty pieces of silver, an amount equal to about $19.50. The name *Iscariot* probably meant that he came from Kerioth, a small town in the south of Judah, while all the other Apostles were chosen from Galilee. As treasurer for the Apostles, he cared for all funds, and at the time when Mary of Bethany broke the alabaster box of precious ointment and anointed Jesus it was Judas who objected to such extravagance and waste. Thus it seems as if he must have followed Jesus for his own personal gain, but after he had shown his Master to the chief priests by kissing him in the Garden of Gethsemane, remorse filled his soul and led him to commit suicide. In *The Light of the World,* Abraham Coles says:

> Motives, that Judas moved, soon spent their force,
> When followed an intolerable remorse,
> The dream of avarice was at an end,
> He had betrayed his living Lord and Friend.

A treacherous person, or one who betrays another while acting as his friend, is often spoken of as a *Judas.*

Judas Tree. The Judas tree, so called because tradition says that Judas hanged himself on one of the species, is one of the poplars, native of Southern Europe. It has large leaves and delicate rose-colored flowers, which appear before the leaves. The American Judas tree is a very hardy poplar, grows to a height of forty feet and is very similar to the European variety. Both have an unusual black-veined wood, which is strikingly beautiful when polished.

JUDE, *jewd,* a short epistle of only twenty-five verses, which forms one book in the New Testament and was probably written by Judas, a brother of Jesus. Its date, place and occasion are unknown, but it seems to denounce the same false teachers as those rebuked in the second chapter of *II Peter.* It is remarkable in that it quotes a saying of Enoch (verse 14), and a dispute between the archangel Michael and Satan regarding the body of Moses (verse 9), quotations which are not found anywhere else. The writer warns some certain body of Christians, which he seems to be addressing, of

future judgment and punishment of the wicked, through the examples of the fallen angels, of Cain, Korah and Balaam, and of the wicked cities of Sodom and Gomorrah.

JUDEA, *ju de'a,* the name given at the time of Christ to the southern division of Palestine, which formerly had been occupied by Dan, Judah, Simeon and Benjamin, four of the Twelve Tribes of Israel. The Mediterranean Sea bounded the country on the west, the Jordan and the Dead Sea on the east, while Samaria was the province directly north of it and Arabia Petraea extended over considerable territory on the south. Although Jesus was born in Bethlehem, a small town in this province, most of his great work was done in distant Galilee or Samaria, so Jerusalem was its only important city in New Testament history. At present the region is a rather desolate, hilly country in the southern part of Syria, belonging to Turkey.

JUDGE, one who presides in a court of law. The judges of the highest courts in Great Britain and in America are called *justices,* but justices of the peace and magistrates are not regarded as judges.

Where there is no jury it is the duty of the judge to determine, from the testimony given, the facts in the case and the law which applies to them. If there is a jury the judge, under the laws of many states and provinces, must permit the jury to be the judge both of the law and the facts. In criminal cases, the jurymen determine the guilt or innocence of the prisoner, and if they find him guilty the judge imposes the sentence prescribed by law.

In Great Britain and in Canada judges are appointed by the Crown and serve for life. In the United States the Federal judges are appointed for life by the President, subject to the approval of the Senate; all others, whether state, county, municipal or circuit court judges, are elected, for a term of years (usually six), by the people. Elected judges may be recalled by popular vote in seven of the American states. For misconduct, American Federal judges can be removed from office through impeachment proceedings, and Canadian judges by the Governor-General upon an address from Parliament. See LAW; COURTS; PROCEDURE; IMPEACHMENT; RECALL, THE.

JUDGES, BOOK OF, an historical book of the Old Testament in which the life of the Children of Israel is described under the rule of the judges, or deliverers of the country. These were the only rulers of the nation for many years after Joshua led the Israelites into the Promised Land. After a short account telling about the subjection of the land after Joshua's death, the history of the rule of six judges is given in detail, while six others are briefly mentioned. These judges, as heroes of the people, were obeyed by most of the nation, thus preparing the way for Saul to be anointed the first king of the united country. The wonderful Song of Deborah, the story of Gideon's army of 300 conquering the Midianites, and the account of Samson's great strength, as well as his reckless valor, are all found in this book, which was probably written by Samuel, although authorities disagree as to its authorship. The period covered by the book is about 350 years.

JUDG'MENT, one of the most important of the intellectual activities; it is the typical act of intelligence. To think is to a great extent to judge. In its widest sense it means the power of weighing facts in order to reach a conclusion or a decision. Sound judgment is the ability to see things in their proper relation.

In its narrower and more technical sense, as used in psychology, judgment means the power we posses to discern the relation of similarity or difference between objects or ideas. A judgment is the assertion of a truth; that is, of that which corresponds with reality. That is why we say that to judge is to discern truth relations. I discern the relation between the ideas of honesty and welfare in life and I arrive at the judgment: "Honesty is the best policy." We also find differences between notions, as in the judgment: "This dog is not a terrier." To judge is to affirm or deny one thing of another, and the result of the act of judging is called a judgment. Every judgment can be put in the form of a sentence or proposition. In each proposition there are three elements: the subject, the predicate and the relation of agreement or disagreement we find between them as the result of our act of judging. The above examples will illustrate this.

Ideas, concepts and percepts are the materials from which we elaborate our judgments. These are supplied partly by our personal experiences and partly by the testimony of others, which we have acquired by our education and reading. The better educated a person is, the greater is his power of forming correct, strong and independent judgments, and a person who forms such judgments will express them in clear, accurate and concise statements.

Related Subjects. The reader is referred to the following articles in these volumes:

Concept	Psychology
Perception	Reason

JUDGMENT, in law, is the decision of a court in a case submitted to it. It becomes the law governing the case unless it is set aside or reversed by a higher court. If a judgment reserves part of a question for future decision, it is called *interlocutory.* Judgment without comment on the rights of the parties to a suit may be given, either *in default,* when no defense is made, or as a *confessed judgment,* when the defendant admits claims against him. In some states and provinces a judgment of money owing becomes a *lien* upon the debtor's real estate; elsewhere an *execution* is necessary. See LIEN.

JUDICIARY, *joo dish' i a ri.* See COURTS.

JU'DITH, a Biblical heroine, the widow of Manasses of Bethulia. When Holofernes, a general of the king of Assyria, besieged her native city, she went to the tent of the invader and was admitted because of her striking beauty. During the banquet held in her honor, Holofernes drank deeply and fell into a profound sleep. Judith then beheaded him with his own sword, and was hailed as the deliverer of Israel. Her history is given with much skill in the Apochryphal book of *Judith* and has inspired many sculptors and painters. It is the subject of Donatello's bronze group in the Lanzi Palace at Florence, and of Horace Vernet's pictures, entitled *Judith on Her Way to Holofernes* and *Judith in the Tent of Holofernes.* The story was also carefully dramatized, for the moving-picture industry, as *Judith of Bethulia;* a magnificent and characteristic setting was provided and millions of people were given a really instructive lesson in Hebrew history.

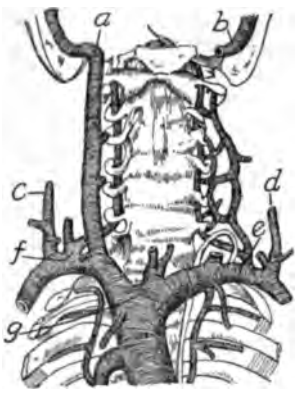
JUDSON, ADONIRAM (1788-1850), the leader of the first missionary party sent out from America. He was born at Malden, Mass., was educated at Brown University and at Andover Theological Seminary, and was ordained in 1812. Shortly afterwards he sailed for India. Thirty-seven years of missionary work, during which he suffered great perils and many hardships, brought rich results. His translation of the Bible into Burmese, a Burmese and English dictionary, almost completed at his death, and numerous converts, were some of the results of his labor. His field lay almost exclusively in Burma. He died at sea while on his way to the island of Mauritius.

JUDSON, HARRY PRATT (1849-), the second president of the University of Chicago, well known as an authority on theoretical and practical politics and international law. Born in Jamestown, New York, he received his education at Williams College, and from 1870 to 1885 served as principal of the Troy (N. Y.) high school, in the meantime securing his master's degree. In 1885 he removed to the West and took the chair of history and pedagogics in the University of Minnesota. Seven years later he became professor of political science at the new University of Chicago, and in the following year was made head of his department and dean of the faculties. He was very closely associated with President Harper and was in thorough sympathy with the latter's policies; and when President Harper died, in January, 1906, Dean Judson was made acting president. In the next year he was formally appointed president, and under his administration the institution has continued to prosper greatly. President Judson is the author of a number of works on history and political science, including *Europe in the Nineteenth Century, The Growth of the American Nation* and *The Essentials of a Written Constitution.*

JUGGERNAUT, *jug' er nawt,* a term from the Sanskrit, meaning *lord of the world,* is the name given to a celebrated temple and idol of Hindustan, in the presidency of Bengal. This is the most celebrated shrine in Hindustan, completed in the twelfth century at an enormous expense. The idol is a carved block of wood, with hideous black face and distended blood-red mouth and with eyes made of precious stones. The idol rests on a throne between two others—his brother Bala-Rama and his sister Subhadra. On festival days the throne of the Juggernaut is placed on a high tower which moves on wheels, and the people pull it along by ropes. The belief that devotees cast themselves in front of this car to be crushed to death probably grew out of the accidental fatalities which sometimes occur. No such deliberately intended sacrifices have been made within two centuries. Every year crowds of pilgrims journey to the temple to worship at this shrine.

JUGULAR VEIN, *joo' gu lar vane,* from the Latin *jugulus,* meaning *collar bone,* is the name given to the four large veins which return blood to the heart from the head and neck. There are two on each side of the neck; one lies close to the surface and carries blood from the external portions of the head and neck; the

second lies deeper, and carries blood from the interior of the cranium. Some veins may be severed without serious consequences, but the cutting of an interior jugular vein is usually fatal. This is due to the fact that the quantity of blood supplied to the brain is very great, and when an interior jugular vein is cut there is a serious loss of this life-giving substance. See VEINS.



JUGULAR VEINS

(*a*) Right internal jugular vein
(*b*) Left internal jugular vein
(*c*) Right external jugular vein
(*d*) Left external jugular vein
(*e*) Left subclavian vein
(*f*) Right vertebral vein
(*g*) Mammary vein

JUGUR'THA (? -104 B.C.), a Numidian prince, who gained and lost the throne of his country by treachery and cunning. Numidia was an ancient country of North Africa, the various tribes of which had been united by Masinissa, grandfather of Jugurtha. The latter was a finely-gifted youth, an expert horseman and skilful in warcraft. In 134 B.C. his uncle, then king, sent him into Spain at the head of a Numidian force fighting with the Romans. While upon this expedition he became the friend of Scipio Africanus Minor and other influential Romans.

Upon the death of his uncle, in order to obtain sole possession of the throne, he killed one cousin and drove the other from the country. The latter appealed to Rome, and as a consequence was given the rule of the eastern part of Numidia, and Jugurtha the western. In a short time Jugurtha, becoming dissatisfied with this arrangement, besieged and killed his cousin and the Romans who were with him at the time. Through the influence of Roman friends and rich bribes he was able for many years to evade the consequences of his crime, but was at last captured by Marius and brought to Rome. As a punishment he was forced to march in the procession celebrating the triumphs of Marius, and was then thrown into the Tullianum, an underground prison, to die an ignominious death. The Jugurthine War is the subject of a celebrated essay by the Roman historian Sallust. See MARIUS, CAIUS.

JUJUTSU, or **JIUJITSU,** *joo jit'soo,* the highly-developed, weaponless art of defense or offense, is the foundation of the system of physical culture of the Japanese. It was probably known as early as the seventh century B.C., and was long a closely-guarded secret art, practiced only by the nobility. It is now taught in some Japanese schools, and soldiers, sailors and policemen are required to perfect themselves in it. Since the beginning of the twentieth century schools for training in jujutsu have been established in Europe and the United States.

The art requires a certain knowledge of anatomy. It consists in making various dexterous twists, blows or grips which disable an antagonist by rendering useless certain parts of his body. Unlike wrestling, it does not depend on muscular strength. A large man may be easily overpowered by a smaller opponent who understands the art. The term is often translated *to conquer by yielding,* and the aptness of this interpretation is shown in the following passage from Lafcadio Hearn's *Out of the East:*

> In jujutsu there is a sort of counter for every twist, wrench, pull, push or bend: only the jujutsu expert does not oppose such movements. No; he yields to them. But he does much more than that. He aids them with a wicked sleight that causes the assailant to put out his own shoulder, to fracture his own arm, or, in a desperate case, even to break his own neck or back.

The person who studies and practices the art of jujutsu receives valuable physical training. He is compelled to adopt a light, nourishing diet, to get plenty of sleep, to practice deep-breathing exercises and to forego all intemperate habits. Moreover, the gymnastic exercises required are extremely beneficial to the physical organism. In Japan both sexes practice jujutsu. I.T.

JULIAN, *jool'yan,* in full, FLAVIUS CLAUDIUS JULIANUS (331-363), Emperor of Rome from 361 to 363, surnamed *The Apostate* on account of his attempt to restore the pagan worship. He was an able ruler and also noted as a writer. He was born at Constantinople, and was the son of Julius Constantius, brother of Constantine the Great. When Constantius II, son of Constantine, massacred the royal family, Julian and his brother Gallus were spared. On the death of his brother, Julian was sent to Milan by Constantius, but was subsequently allowed to go to Athens, where he studied

philosophy, became a disbeliever in Christianity and espoused paganism. Having been appointed commander of an army against the Germans, he defeated them at Strassburg and also compelled the Franks to make peace. He became very popular in consequence, and when he was ordered by Constantius to set out for the East the troops rebelled and proclaimed him emperor (360).

The only obstacle to his attainment of imperial honors was removed by the death of Constantius, which occurred soon after, and on the eleventh of December, 361, Julian made his triumphant entrance into Constantinople. He endeavored to restore paganism in all its magnificence, but surprised his subjects by his edict of toleration, and although he opposed Christianity he did not persecute the Christians themselves. All of his efforts were fruitless, and in the reign of his successor Christianity again became the religion of the imperial court. Julian attained fame as an author, and some of his orations, satirical essays and letters, which were written in Greek, are still extant.

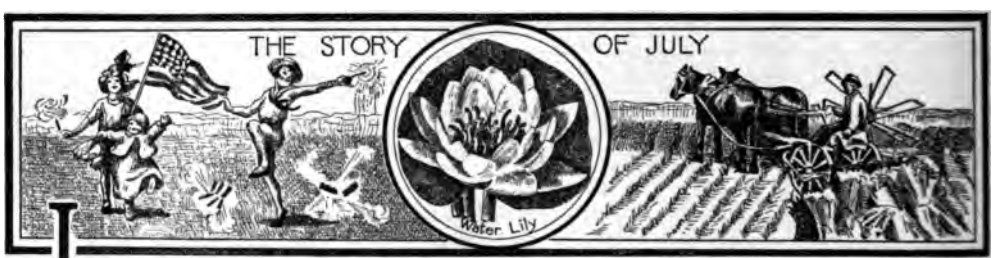
JULIAN CALENDAR. The name given to the Roman calendar, after important changes had been made in it by Julius Caesar. See CALENDAR; EPOCH.

JULIUS, *jool'yus,* the name of three Popes of Rome, who occupied the Papal chair between A. D. 337 and 1555.

Julius I, SAINT, was Pope from 337 to 352. His reign fell in troubled times, when the Church was divided over the Arian controversy. The followers of Arius, who denied that Christ was equal with the Father, preferred grievous charges against Saint Athanasius, which the Pope dismissed with indignation. With the Emperor Constans, he called the Council of Sardica. His day is observed on April 12.

Julius II, Pope from 1503 to 1513, was a great statesman and a liberal and judicious patron of the fine arts. He devoted all his energies to the complete restoration of Papal sovereignty, and to the extinction of foreign domination in Italy. He laid the corner stone of Saint Peter's Church, and his two great diplomatic feats were the formation of the League of Cambrai in 1508, and of the Holy League in 1512.

Julius III, Pope from 1550 to 1555, was born at Rome in 1487. While officiating as cardinal he was chosen as one of three legates to open and preside over the Council of Trent (see TRENT, COUNCIL OF). As Pope, in 1551, he reopened this council after its sittings had been discontinued for two years. He was zealous and optimistic, and in this spirit sent Cardinal Pole to England to endeavor to bring the English Church once more within the pale of Rome. Disheartened by failure, he died in 1555.



JULY, the MONTH OF JULIUS, is the seventh month of the year, according to the modern calendar. The earliest Roman calendar made it the fifth month, and gave it the name of *Quintilis,* which means *fifth,* but it had the honor to be the birth month of the great Julius Caesar, and when his calendar reform went into effect it was rechristened for him. Previous to Caesar's time it had but thirty days, but he added an extra day, to give it the same length as the longest months. The special flower of July is the water lily, and its gem the ruby. See CALENDAR.

Its Character. Summer begins in June, but reaches its full maturity in July, which in the north temperate regions is likely to be the hottest month of the year. Usually, however, the heat is not so oppressive as it is earlier or later in the summer, for in most localities the air is rather dry and clear. Under the burning sun the grass and leaves begin to lose the freshness and greenness of June, and in places of little rain the fields are often burnt quite brown by the last of the month. Flowers thrive, however, and many of the most brilliant of them are in their prime. The roses have not quite

JULY CALENDAR

Birthdays

2. Sir Charles Tupper, 1821
3. John S. Copley, 1737
4. Nathaniel Hawthorne, 1804
   Giuseppe Garibaldi, 1807
   Stephen C. Foster, 1826
5. Sarah Siddons, 1755
   David C. Farragut, 1801
6. John Huss, 1369
   John Paul Jones, 1747
8. Fitz-Greene Halleck, 1790
   John D. Rockefeller, 1839
9. Elias Howe, 1819
10. John Calvin, 1509
    Sir William Blackstone, 1723
11. John Quincy Adams, 1767
12. Julius Caesar, 100 B. C.
    Henry D. Thoreau, 1819
14. Cardinal Mazarin, 1602
15. Rembrandt, 1606
    Henry E. Manning, 1808
16. Sir Joshua Reynolds, 1723
    Mary Baker Eddy, 1821
17. Andrea del Sarto, 1487
    Isaac Watts, 1674
    John Jacob Astor, 1763
18. William Makepeace Thackeray, 1811
19. Samuel Colt, 1814
20. Francisco Petrarch, 1304
23. James Gibbons, 1834
24. Alexander Dumas, the Elder, 1802
    J. G. Holland, 1819
25. Simon Bolivar, 1783
    Arthur James Balfour, 1848
    Maxfield Parrish, 1870
26. George Clinton, 1739
    Sir John Beverley Robinson, 1791
27. Thomas Campbell, 1777
28. Jean Baptiste Corot, 1796
    Alexander Dumas, the Younger, 1824
29. Alexis de Tocqueville, 1805
30. Samuel Rogers, 1763
31. John Ericsson, 1803

Events

1. Debate on Declaration of Independence began, 1776
   Beginning of Battle of Gettysburg, 1863
   Canadian Confederation Act went into effect, 1867
   Battle of El Caney, 1898
2. President Garfield shot, 1881
   San Juan Hill occupied by Americans, 1898
3. Last day of Battle of Gettysburg, 1863
   Idaho admitted to the Union, 1890
4. Declaration of Independence signed, 1776
   Surrender of Vicksburg, 1863
5. British retook Ticonderoga, 1777
   Battle of Wagram, 1809
   William Booth founded Salvation Army, 1865
6. John Huss burned at the stake, 1415
7. Independence of Haiti proclaimed by Toussaint, 1801
   Allies entered Paris, 1815
   United States annexed Hawaii, 1898
8. Battle of Pultowa, 1709
   Great fire at Saint John's, Newfoundland, 1892
9. Braddock's defeat, near Fort Duquesne, 1755
   Canada proclaimed an amnesty for participants in Riel's Rebellion, 1886
10. World's first merchant submarine reached America from Germany, 1916
    Inauguration of Millard Fillmore, 1850
    Canadian Parliament passed copyright bill, 1900
11. Alexander Hamilton mortally wounded in a duel with Aaron Burr, 1804
    Wyoming admitted to the Union, 1890
12. Peace of Villafranca, 1859
13. Ordinance of 1787 adopted, 1787
15. Cawnpore captured by General Havelock, 1857
    France declared war on Germany, 1870
16. District of Columbia established, 1790
17. Charles VII of France crowned at Rheims through efforts of Joan of Arc, 1429
20. Trial of Louis Riel began at Regina, Canada, 1886
21. English fleet attacked the Armada, 1588
    First Battle of Bull Run, 1861
22. Quebec began celebration of its tercentenary, 1908
24. British took Gibraltar, 1704
    Mormons reached Salt Lake, 1847
25. Battle of Lundy's Lane, 1814
26. Nova Scotia taken from France by England, 1758
    Disestablishment of the Irish Church, 1869
27. Colonial army invested Boston, 1775
28. Robespierre guillotined, 1794
    Alabama left Birkenhead, England, 1862
30. Washington's army occupied Germantown, 1777
    Boer force near Middleburg surrendered to Kitchener, 1901
31. Columbus discovered island of Trinidad, 1498
    Austrians occupied Lublin, 1915

For Study

Ant
Blackberry
Bobolink
Bumble bee
Clover
Declaration of Independence
Dominion Day
Fish
Flag
Grasshopper
Heron
Independence Hall
Lafontaine's Fables
Mosquito
Sun

QUOTATIONS FOR JULY

1. From our Dominion never
Take thy protecting hand!
United, Lord, forever,
Keep thou our father's land!
John Campbell, Duke of Argyll.

2. Then came hot July, boiling like to fire,
That all his garments he had cast away. *Spenser.*

3. How sleep the brave who sink to rest
By all their country's wishes bless'd! *Collins.*

4. When Freedom, from her mountain height,
Unfurled her standard to the air,
She tore the azure robe of night,
And set the stars of glory there. *Drake.*

5. I have closed my books and hidden my slate,
And thrown my satchel across the gate.
My school is out for a season of rest.
And now for the schoolroom I love the best. *Bates.*

6. Such is the patriot's boast, where'er we roam,
His first, best country ever is at home. *Goldsmith.*

7. My country's good with a respect more tender,
More holy and profound, than mine own life. *Shakespeare.*

8. No path of flowers leads to glory. *La Fontaine.*

9. A peace no other season knows,
Hushes the heavens and wraps the ground. *Bryant.*

10. Our fathers fought for liberty,
They struggled long and well;
History of their deeds can tell—
But ourselves must set us free. *Lowell.*

11. This hand, to tyrants ever sworn the foe,
For Freedom only deals the deadly blow. *J. Q. Adams.*

12. Loud is the summer's busy song,
The smallest breeze can find a tongue,
While insects of each tiny size
Grow teasing with their melodies,
Till noon burns with its blistering breath
Around, and day lies still as death. *Clare.*

13. They are slaves who dare not be
In the right with two or three. *Lowell.*

14. When the scarlet cardinal tells
Her dream to the dragon fly,
And the lazy breeze makes a nest in the trees
And murmurs a lullaby,
It is July. *Sweet.*

15. O native land! through weal and woe,
Thou hast my heart where'er I go. *Peck.*

16. And look at the broad-faced sun, how he smiles
On the dewy earth that smiles in his ray,
On the leaping waters and gay young isles;
Ay, look, and he'll smile thy gloom away. *Bryant.*

17. I must be measured by my soul!
The mind's the measure of the man. *Watts.*

18. Where'er one man may help another—
There is the true man's birthplace grand,
His is a world-wide fatherland! *Lowell.*

19. Were half the power that fills the world with terror,
Were half the wealth bestowed on camp and courts
Given to redeem the human mind from error,
There were no need of arsenals nor forts. *Longfellow.*

20. The Summer looks out from her brazen tower,
Through the flashing bars of July. *Thompson.*

21. Breathes there the man with soul so dead
Who never to himself hath said,
This is my own, my native land? *Scott.*

22. When faith is lost, when honor dies,
The man is dead. *Whittier.*

23. My schoolroom lies on the meadow wide,
Where under the clover the sunbeams hide,
Where the long vines cling to the mossy bars,
And the daisies twinkle like fallen stars. *Bates.*

24. The crowning fact
The brightest act
Of Freedom is the freeman's vote. *Whittier.*

25. The love of liberty with life is given,
And life itself the inferior gift of Heaven. *Dryden.*

26. And how can man die better
Than facing fearful odds
For the ashes of his fathers
And the temples of his gods? *Macaulay.*

27. Britannia needs no bulwarks,
No towers along the steep;
Her march is o'er the mountain waves,
Her home is on the deep. *Campbell.*

28. When the heat like a mist veil floats,
And poppies flame in the rye,
And the silver note in the streamlet's throat
Has softened almost to a sigh,
It is July. *Sweet.*

29. Strike—for your altars and your fires!
Strike—for the green graves of your sires!
God, and your native land! *Halleck.*

30. And feeling hearts, touch them but lightly, pour
A thousand melodies unheard before! *Rogers.*

31. They love their land, because it is their own,
And scorn to give aught other reason why. *Halleck.*

and the poppies, the dahlias, the sweet nd the nasturtiums are in full bloom. r is full of the hum of insects, birds dart here in search of their food, and over e flowers the butterflies hover. All in is a season of abundant life, and if he s the child released from school can learn of nature in this one month than in sev- onths of formal "nature study" in the om.

ial Days. Both Canada and the United have days for very special observance y. Canada celebrates the first of the as Dominion Day (which see), the day ich the Confederation Act went into while in the United States July 4 is ed as Independence Day (which see), in y of the Declaration in which the colo- nnounced their independence of Great . The French honor July 14 as the rsary of the fall of the Bastille (which nd on some of these celebrations hun- of prisoners have been pardoned and d. Three Presidents of the United States n July 4—Jefferson and John Adams in nd Monroe in 1831.

Y REVOLUTION, an uprising of the people against their tyrannical king, s X, and led because curred in . On the all of Na- in 1815 e of Bour- kings was d in the of Louis . Both he is brother s, his suc- adopted a ic policy, en in July, Charles is- dicts inter- with the y of the nd making ry changes laws regu- the right

COLUMN OF JULY

e, the people of Paris rose in revolt. As lt, Charles was dethroned, and Louis pe, a member of the younger branch of ourbon family, was given the crown. The influence of the July Revolution was felt throughout Europe, especially in the Netherlands, where the Belgians revolted and declared themselves independent of Holland.

Column of July, a pillar of bronze, erected in Paris on the site of the famous Bastille of the French Revolution (see BASTILLE). It was designed as a memorial to the 651 citizens who fought and died for the liberty of France, July 27, 28 and 29, 1830. The names of the revolutionists are carved on the column, and the bodies of these victims are entombed in the vaults below, as are also the bodies of those who were killed in the Revolution of 1848. Ascent is made to the top of the column, 154 feet above the ground.

JUMNA, a great river of Northern India, one of the important tributaries of the Ganges. It rises in the Himalayas, flows in a general southerly direction and falls into the Ganges below Allahabad. Two canals, the eastern and western Jumna canals, lead from it, and in the hot season draw off much of its water to irrigate the dry plains. Its total length is almost 900 miles, and its drainage basin has an area of 118,000 square miles.

JUMPING BEAN, the seed of several plants of the spurge family, grown in Central and South America. The seed gets its peculiar name from its activity when inhabited by the full-grown larva of a certain gray moth. The seeds are somewhat triangular in shape and are made to roll from side to side as well as to jump. They are imported into the United States, where they are called *Mexican jumping beans,* or *broncho beans.* The latter is a local name in the Southwest.

JUNCO, *jung'ko,* the popular name for a group of "snowbirds," the latter name referring to their habit of flying down from the North with the first cold, snowy weather. They are found on both continents in the colder countries, are very common in the northeastern part of the United States and in Canada, and some have found their way north to Alaska and Siberia. These plump little birds have dull-slate plumage and white breasts and white or flesh-colored bills. They build their nests low on the ground, in meadows or in hollow stumps or logs, using grasses, hairs and feathers. The eggs, four or five in a nest, are white or bluish-white, evenly marked with small, brownish spots. Their most usual note is something like *'tsip,* and their song is low and sweet, similar to the song of the European robin redbreast.

JUNE CALENDAR

Birthdays

1. Ben Jonson, 1573
2. John Randolph of Roanoke, 1773
3. George V of England, 1865
4. George III of England, 1738
5. Socrates, 469 B. C.
6. Nathan Hale, 1758
8. Charles Reade, 1814
   John Everett Millais, 1829
9. John Howard Payne, 1792
10. Henry M. Stanley, 1841
    Robert Schumann, 1810
12. Charles Kingsley, 1819
13. Winfield Scott, 1786
    Thomas Arnold, 1795
14. Harriet Beecher Stowe, 1812
15. Edvard Grieg, 1843
17. John Wesley, 1703
22. H. Rider Haggard, 1856
23. Josephine, Empress of the French, 1763
28. Henry VIII of England, 1491
    Jean Jacques Rousseau, 1712
29. Peter Paul Rubens, 1577

Events

1. Kentucky admitted to American Union, 1792
   Tennessee admitted, 1796
   Two-cent postage established between United States and Great Britain, 1908
2. Beginning of Reign of Terror in French Revolution, 1793
3. First steam vessel arrived in Boston from England, 1840
   Lee took command of Confederates at Richmond, 1862
4. Treaty of peace between United States and Tripoli signed, 1805
5. First public balloon ascension, in France, by Montgolfier Brothers, 1783
6. Alsace annexed to Germany, 1871
8. Lincoln nominated for President, 1864
   Canada organized an army of 35,000 because of Fenians
10. Navigation Acts enforced in colonies, 1664
    King and queen of Serbia assassinated, 1903
11. A committee appointed by Colonial Congress to draw up Declaration of Independence, 1776
    Public schools opened in Philippines, 1906
12. City of New York incorporated, 1665
13. Lord Baltimore granted charter to Maryland, 1633
    First Canadian Parliament opened in Ottawa, 1841
14. United States Congress decided on a national flag, 1777
    Hawaii organized as a United States territory, 1900
15. Arkansas admitted to the Union, 1836
    Great Britain and United States signed Oregon Treaty, 1846
    William II became Emperor of Germany, 1888
16. Texas Congress agreed to terms of annexation to United States, 1845
    Santiago, Cuba, bombarded, in Spanish-American War, 1898
17. Battle of Bunker Hill, 1775
    Corner stone of Bunker Hill Monument laid, 1825
18. United States declared war on Great Britain, 1812
    Battle of Waterloo, 1815
19. First assembly of Virginia met, 1619
    Albany Convention met, 1754
    West Virginia admitted to the Union, 1863
    Statue of Liberty received from France, 1885
20. English prisoners perished in Black Hole of Calcutta, 1756
    Michigan admitted to the Union, 1837
    Accession of Queen Victoria, 1837
    Alaska sold to United States by Russia, 1867
22. Abdication of Napoleon, 1815
    Haakon VII crowned king of Norway, 1906
    George V crowned king of Great Britain, 1911
24. John and Sebastian Cabot found the shores of North America, 1497
    King Philip's War began, 1675
25. George A. Custer killed by the Indians in battle, and his command annihilated, 1876
26. English Corn Laws repealed, 1846
27. First telegraph message passed between New York and Boston, 1847
28. Coronation of Queen Victoria, 1837
29. Magna Charter probably signed on this day, 1215
    Parliament authorized Canada to establish new provinces, 1871
30. Treaty of peace between United States and Algiers, 1815
    Indian Territory set aside for Indians, 1834

For Study

Battle of Bunker Hill
Dew
Egg
Flower
Nathan Hale
Home Sweet Home
Jack-in-the-Pulpit
June Bug
Martin
Navigation Acts
Nest
Rose
Sandpiper
Harriet Beecher Stowe

QUOTATIONS FOR JUNE

1. Then let us, one and all, be contented with our lot;
   The June is here this morning, and the sun is shining hot;
   Oh! let us fill our hearts up with the glory of the day,
   And banish ev'ry doubt and care and sorrow far away. *Riley.*

2. A noise like of a hidden brook
   In the leafy month of June,
   That to the sleeping woods all night
   Singeth a quiet tune. *Coleridge.*

3. It's surely summer, for there's a swallow:
   Come one swallow, his mate will follow,
   The bird race quicken and wheel and thicken. *C. G. Rossetti.*

4. All green and fair the Summer lies,
   Just budded from the bud of Spring.
   Coolidge.

5. Oh, my love's like a red, red rose,
   That's newly sprung in June.
   Burns.

6. O summer day beside the joyous sea!
   O summer day so wonderful and white!
   Longfellow.

7. Then came the jolly sommer, being dight
   In a thin silken cassock, coloured greene. *Spenser.*

8. We bring roses, beautiful fresh roses,
   Dewy as the morning and colored like the dawn. *Read.*

9. We sit in the warm shade and feel right well
   How the sap creeps up and the blossoms swell;
   We may shut our eyes, but we cannot help knowing
   That skies are clear and grass is growing. *Lowell.*

10. Oh, for boyhood's time of June,
    Crowding years in one brief moon.
    Whittier.

11. There through the long, long summer hours
    The golden light should lie,
    And thick young herbs and groups of flowers
    Stand in their beauty by. *Bryant.*

12. Yon rosebuds in the morning dew,
    How pure amang the leaves sae green!
    Burns.

13. From all the misty morning air, there comes a summer sound,
    A murmur as of waters from skies, and trees, and ground. *Gilder.*

14. (Flag Day)—
    Hats off!
    Along the streets there comes
    A blare of bugles, a ruffle of drums;
    A flash of color beneath the sky;
    Hats off!
    The flag is passing by! *Bennett.*

15. No price is set on the lavish summer;
    June may be had by the poorest comer.
    Lowell.

16. The idle butterfly
    Should rest him there, and there be heard
    The housewife bee and humming bird.
    Bryant.

17. It is the month of June,
    The month of leaves and roses.
    Willis.

18. Gather ye rosebuds while ye may,
    Old Time is still a-flying,
    And this same flower that smiles to-day
    To-morrow will be dying. *Herrick.*

19. Flowery June,
    When brooks send up a cheerful tune,
    And groves a joyous sound. *Bryant.*

20. Before green apples blush,
    Before green nuts embrown,
    Why, one day in the country
    Is worth a month in town.
    C. G. Rossetti.

21. And the stately lilies stand
    Fair in the silvery light,
    Like saintly vestals, pale in prayer.
    Dorr.

22. And every time a June day dies
    We sigh, "Comes ever such a day again?" *Carr.*

23. O beautiful, royal Rose,
    O Rose, so fair and sweet!
    Queen of the garden art thou!
    Dorr.

24. The lily has an air,
    And the snowdrop a grace,
    And the sweet pea a way,
    And the heart's-ease a face—
    Yet there's nothing like the rose
    When she blows. *Rossetti.*

25. The flowers are Nature's poems,
    In blue and red and gold;
    With every change from bud to bloom,
    Sweet fantasies unfold. *Unknown.*

26. The grass so little has to do—
    A sphere of simple green,
    With only butterflies to brood,
    And bees to entertain,
    And stir all day to pretty tunes
    The breezes fetch along,
    And hold the sunshine in its lap,
    And bow to everything. *Dickinson.*

27. Now simmer blinks on flowery braes,
    And o'er the crystal streamlet plays.
    Burns.

28. What would the rose with all her pride be worth,
    Were there no sun to call her brightness forth? *Moore.*

29. And what is so rare as a day in June?
    Then, if ever, come perfect days;
    Then Heaven tries earth if it be in tune,
    And over it softly her warm ear lays;
    Whether we look or whether we listen
    We hear life murmur, we see it glisten.
    Lowell.

30. June falls asleep upon her bier of flowers;
    In vain are dewdrops sprinkled o'er her,
    In vain would fond winds fan her back to life;
    Her hours are numbered on the floral dial. *Larcom.*

JUNE, *joon*, the sixth month of the year, has always been the favorite month of poets. "The leafy month of June," one of them calls it, and rightly, for during its long days the trees and shrubs are at their freshest and best, and the flowers are most plentiful and richest in color. Especially, in temperate climates, it is the month of roses.

No less truly is June the month of brides. This is no modern idea, but dates back to early Roman days. May was a particularly unlucky month for weddings, the ancients thought, but June, especially that part when the moon was at the full, was better than any other month. And all through the Middle Ages this superstition remained in force. The beauty of the month, and the luxuriance of its flowers, do indeed fit it well for all festivities, as does the fact that in most localities June has as many days of sunshine as any other month.

The Month's History. It was the Romans who named June, which with them was the fourth month of the year. Some authorities believe that its name was taken from that of Juno, and this seems reasonable enough, for the great queen of the gods was the patron deity of marriage (see JUNO); but more probably it was derived from *juniores,* for this month was specially dedicated to the younger men, as the preceding one was to their elders. In the time of Romulus (which see) the month had thirty days. Later it lost four of these then regained them, so when Julius Caesar began his reform of the calendar it had but twenty-nine. He added the extra day, and ever since June has had thirty days.

June Activities. June is a busy month in nature. "Fruits that shall swell in sunny June" wrote Bryant; when June comes the blossoms of the fruit trees have had their day, and the tiny green fruit is beginning to appear. The bees, too, are busy, carrying home honey and helping to fertilize the flowers, though this they do not know.

> A swarm of bees in June
> Is worth a silver spoon,

says an old rhyme. Butterflies hover over the roadside flowers, and the mother birds brood over their eggs, while their mates sing to them and bring them food.

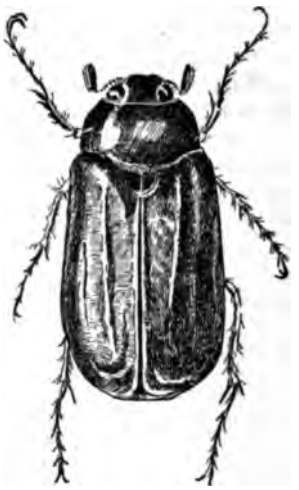
June is not so much a time of transition as is May, for summer has really come, but it is a season of undiminished activity, when the "letting down and the drying up" which come in the hotter months of July and August have not yet begun. No month has more to interest the children or to draw them out-of-doors. The study of the bee and the butterfly, of many of the sweetest flowers, and of certain phases of the "home-life" of the birds may well be undertaken at this time.

The lists of birthdays, events and suggestions for study on pages 3186 and 3187 will suggest to the teacher or to the parent many special talks or special exercises which can be of varying length, as befits the importance of the subject.

JUNEAU, *joo no',* the capital of Alaska, situated on the coast, about 100 miles north of Sitka. The estimated population is about 5,000, and the surrounding country contains as many more white inhabitants. Juneau is the center of government activities for the territory. The territorial legislature meets there and most of the government officials reside there. It is in many respects a modern city, with churches, public schools and police and fire departments. It is an important supply station, and has steamship connection with all the Alaskan ports and with Seattle and other cities on Puget Sound. See ALASKA.

JUNE BUG, or **MAY BEETLE,** popular names for a large, brown beetle common in the United States in the months of May and June. These beetles are seen principally at night when, attracted by spots of light, they fly about street lamps in great numbers and find their way into lighted rooms. There they often bump awkwardly into furniture and people, falling helplessly to the ground and kicking and struggling until they right themselves for another flight. They eat the young leaves

of trees and shrubs and often do much damage. The larvae (young) are large white grubs with brown heads, which live in the ground a year or more, eating the roots of grass and small plants. Strawberry plants are commonly injured by them. The larvae may be destroyed by an emulsion of dilute kerosene soap, poured into the ground. Kerosene will also kill the adults, which may be enticed into pans of this substance by lights placed over the utensils.



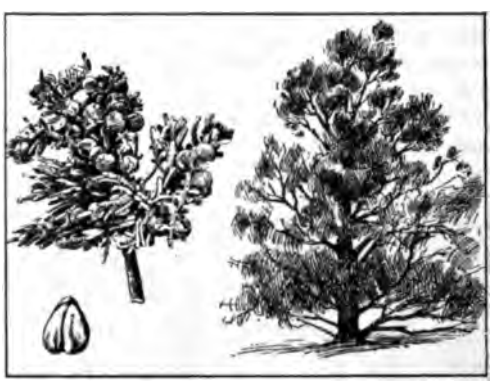
JUNE BUG
The insect pictured is one and three-fourths times natural size.

JUNGFRAU, *yoong'frou,* a mountain in Switzerland in the Bernese Alps, twelve miles south of the village of Interlaken. The Jungfrau, whose name means *maiden,* or *virgin mountain,* is regarded by a great many travelers as the most beautiful mountain of the Swiss Alps. Steep and majestic, and crowned with snow, it rises 13,670 feet above the sea. The ascent of this peak was first made in 1811 by two Swiss brothers; later several other daring climbers reached the top by different routes. Any traveler can now easily, and with entire comfort, reach its summit. An electric railroad has been constructed which carries passengers over 11,000 feet up the slopes, the remainder of the trip being accomplished by means of elevators.

JUNGLE FOWL, *jung'g'l foul,* the name of a group of birds native to Southern Asia and the East Indies, from which the ordinary domestic fowls have descended. It is supposed that they were first domesticated in the Malay Peninsula. The original home of these birds was the jungle, a term derived from *jangala,* a Sanskrit word meaning *tangled wilderness,* or *thicket.* The wild birds, which are common in India, run with great speed, fly rather high, and roost in trees. The hen cackles in much the same manner as our domestic fowls, but the cock crows like a bantam rooster. The nest is a simple depression in the ground, lined with grass, and ten or twelve eggs are laid.

JU'NIPER, a group of evergreen trees and shrubs of the cone-bearing family, containing about thirty species, which are found distributed throughout the northern hemisphere, except in the tropics. The common juniper occurs most frequently as a shrub from two to six feet in height, and throughout its range in North America it grows treelike in size only in a few counties in Southern Illinois. There it attains a height of from fifteen to nearly twenty-five feet and a diameter of from six to eight inches. The rough and thickly-branched trunk is clothed in a bark of a deep chocolate-brown, tinged with red; the lustrous-green leaves are narrow and sharp-pointed and are chalky-white in the upper side, the latter quality being a characteristic only of this species. Round, bluish-black berries that require two years to ripen are borne by the common juniper.

Its wood, which is hard, fragrant and yellowish-red, verging to brownish in the heart, is of value for veneering when of sufficient size. The dry twigs, roots and berries are used for fumigation, and the berries are used both to flavor gin and in medicinal preparations. From the bark of the plant ropes may be made, and coarse baskets are woven from the roots in some parts of the Scottish Highlands. Another important species found in North America is the Virginia juniper, or *red cedar,* whose beautiful red heartwood is extensively used in making lead pencils and furniture. This wood admirably resists decay and is utilized in making fence posts.



THE JUNIPER
The tree, detail of a branch, and fruit. The latter is shown about natural size.

JUNIUS, *joon'yus,* LETTERS, a series of letters, seventy in all, signed "Junius," which appeared in the London *Public Advertiser,* between 1769 and 1772, and caused a furor in

English politics. In them the author boldly denounced the inefficiency of several leading members of the Ministry. The *Address to the King,* published December 19, 1769, was the letter which caused the greatest sensation. In it the king was reminded of the fate of Charles I. Woodfall, the printer and publisher of the letters, was prosecuted, but was acquitted. "Junius" made so many enemies that he never found it safe to reveal his identity. The letters have been ascribed to Burke, Lord Shelburne, Colonel Barre, Wilkes, Lord George Sackville and several others, but it is the general opinion that Sir Philip Francis was the author. The circumstances surrounding the position of "Junius" correspond with the history of Francis, and the handwriting of "Junius" is very similar to that of Francis, although experts differ in their opinions on this point.

JU'NO, the chief Roman goddess of classical mythology, identified with the Greek *Hera.* She was regarded as queen of the gods and of heaven, and was also the especial genius of the female sex, worshiped by women as the protectress of all that concerned marriage and the birth of children. She was represented as the jealous and exacting wife of Jupiter, and her life was not a very happy one. She spent a great deal of time in planning punishments for Jupiter's mortal wives or their sons. She was supposed to be a very beautiful, matronly woman. In works of art Juno is sometimes represented as drawn through the air by a pair of sacred peacocks harnessed to her chariot. The goose and the cuckoo were also sacred to her. See MYTHOLOGY. F.J.C.

JUNO

JUN'TA, meaning *assembly,* is a name given in Spain and Spanish-American colonies to a body of persons combined for political or administrative purposes, whether summoned by the sovereign or simply called together on their own accord as representatives of the people. The Whig Junta of England was an organization of the chiefs of that party in the reigns of William III and Anne. The interior committee of the Privy Council under Charles I, which was the beginning of the modern Cabinet, was contemptuously called the *Juncto* by the Earl of Clarendon. Benjamin Franklin organized a debating society called the Junta which, in 1743, developed into the American Philosophical Society.

JU'PITER, the Roman mythological name for the king of heaven whom the Greeks called Zeus. Having by strength and cleverness brought about the overthrow of his father, Saturn, he divided the world with his two brothers, giving to Pluto the underworld, to Neptune the sea, and reserving for himself the sky, with supreme sovereignty over gods and men. He married first the goddess of wisdom, Metis, but becoming alarmed by a prophecy that his first child should be wiser than its father, he swallowed his wife. This precaution proved vain, however, for shortly afterward there sprang from his head, full grown and full armed, the goddess Minerva, whose name became a synonym for wisdom of the highest kind.

JUPITER
From a bust in the Vatican, Rome.

As his wife, and the queen of heaven, Jupiter selected Juno, but her jealousy and dignity irked him at times, and he solaced himself with many other wives, both among the goddesses and among mortals. To him were born many children, of whom the most famous were Apollo and Diana, Mars, Hebe, the Fates and the Muses.

Greek artists represented this greatest of their gods as a bearded man of middle age, handsome and majestic and generally benignant. Beside him perched the eagle, his strong-winged messenger, and in his hands were grasped the thunderbolts with which he punished gods and men. See MYTHOLOGY.

JUPITER, the "giant planet" and king of the solar system, is the largest planet and the fifth in their order from the sun. Its diameter, 88,000 miles, is almost eleven times that of the earth, its surface is 122 times and its volume 1,355 times that of the earth. Its density, however, is less than one-fourth that of the earth. So while it would take more than 1,300 earths to fill the space occupied by Jupiter, it would take only 316 earths to equal

JUPITER AND ITS SATELLITES

it in weight. If we could imagine a huge balance with Jupiter in one scale pan, we should have to place 316 earths in the other to balance it. A man weighing 150 pounds on the earth would weigh 400 pounds on Jupiter. Next to the sun Jupiter is the largest body in the solar system. Its mean distance from the sun is 483,000,000 miles, over five times that of the earth.

Jupiter is easily recognized, since it is, next to Venus, the brightest planet, and sometimes it rivals that planet in brightness. When seen through an opera glass or a small telescope it appears slightly flattened, owing to the difference between its polar and equatorial diameters. When seen through a large telescope the planet presents a beautiful appearance. The disk is marked with belts of different colors which run parallel to the equator. The outline is hazy, showing that the planet is enveloped in an atmosphere of clouds and fog. The light is brightest in the center and diminishes towards the edges, the side farthest from the sun being darker than the other. In 1878 a great red spot, 30,000 miles long and 7,000 miles wide, was noticed and, until recently, this was a prominent feature, but it is now very dim.

Jupiter turns upon its axis once in nine hours and fifty-five minutes, so its day is less than one-half of our day. Its year, however, is nearly twelve of our years. Its axis is but slightly inclined to the plane of its orbit, therefore, the change of season must be slight (see SEASONS).

Satellites. Jupiter is accompanied by nine moons, four of which have been discovered since 1892. The fifth satellite was discovered by Prof. E. E. Barnard of the Lick Observatory, and a sixth and seventh by C. D. Perrine of the same institution. The eighth satellite was discovered in 1908, and the ninth in 1914. The eighth has the peculiarity of revolving around the planet in the opposite direction from the others. Romer made his great discovery of the velocity of light by observation of the eclipses of the satellites of Jupiter. See LIGHT.

It is generally believed that Jupiter is still in a heated and partially gaseous condition, and that it is not a solid body like Mars and Venus, but resembles the sun, except that it gives off much less light. W.F.R.

See PLANET, for comparative sizes of the planets and distances from the sun; see SUN, for comparative sizes of the sun and the planets.

JURA, *joo'ra,* a mountain range extending from northeast to southwest along the borders of Switzerland and France, forming a high plateau between the Rhine and the Rhone rivers. The German Jura begins at the Rhine and extends about 300 miles to the main valley. South of the Rhone the chain is known as the Jura Alps, merging there with other branches of the great Alps range. Towering peaks rise at intervals, and along the lower elevations beautiful lakes are formed, the largest being Lake Geneva, a famous resort. The highest peaks are Reculet and Crête de la Neige, both over 5,600 feet in altitude.

Mineral products are scarce for so mountainous a country, although iron, copper and salt are mined in fair quantities. Marble, alabaster and granite are quarried, and the valuable timber is a source of profit. Lausanne, a beautiful city, lies on the southern slope of the mountains. The two chief rivers having their source in the chain are the Doubs and the Ain, both French streams. The geological formation is chiefly limestone, the range giving its name to the Jurassic, or second system in point of age of the geological periods.

JURASSIC, *joo ras'ik,* **PERIOD,** that division of geologic time immediately following the Triassic. The formations constitute what is called the Jurassic System, and lie between the Triassic below and the Cretaceous above. The name is given because of the prominence of the rocks in the Jura Mountains. In North America Jurassic formations are found in California, Oregon and, to a slight extent, in Alaska.

The close of the period was marked by great upheavals in the western part of North America. At this time the formation of the Sierras and the Klamath mountains began.

Related Subjects. The reader is referred to the following articles in these volumes:

Cretaceous System	Mesozoic Era
Geology (for diagram)	Triassic System

JURUA, *zhoo roo ah'*, a river of Brazil rising in the mountains of Peru and flowing northeast to join the Amazon near Fonteboa. It has a winding course of 1,200 miles through a sparsely-settled region, and is navigable for about one-third of its length.

JURY AND TRIAL BY JURY. Trial by jury is an institution prominent in the history of Anglo-Saxon resistance to oppression. The principle that a freeman cannot be deprived of liberty or property except by the "lawful judgment of his peers [equals]" was stated in the Magna Charta, 1215. The English uprisings against the Stuart kings and American rebellion against George III were partly in opposition to unjust prosecutions by the Crown, abuses against which the *grand jury* in particular is a defense.

Grand Jury. This is probably a development of an Anglo-Saxon custom by which the twelve senior thanes decided whether accused men should submit to the Trial by Ordeal or Combat, or be freed. In principle this old institution agrees with the modern grand jury, of from twelve to twenty-three men, who determine whether there is sufficient evidence against an accused man to justify a trial. They do not hear the defendant's story, but if twelve jurors believe that the accusations are possibly correct, they call them a *true bill*, and he is indicted. As in Saxon days, the jurors may rely on their own knowledge as well as that of witnesses. In the British Empire many consider that the grand jury has outlived its usefulness, and in some of the states of the American Union it is employed only in emergencies. The grand jury is impaneled by a judge, to whom it reports on all cases heard by it.

Petit, or Petty, Jury. This, the common jury, decides from the evidence presented at a trial what are the facts. In a criminal case it renders a verdict, *guilty, not guilty,* or, as in Scotland, *not proven.* In civil cases it may fix the amount of damages. The petit jury consists of twelve persons.

The Norman conquerors of England, to gain information necessary to the Crown (including probably that contained in the Domesday Book), summoned the men of a neighborhood to testify. From this custom, apparently, the jury developed. It was at first confined to land disputes. The twelve men thought most familiar with the question were summoned; if their opinion differed more were called, until twelve voted together. The jurymen were thus witnesses as well, whereas, in modern practice, a man is considered an incompetent juryman if he has knowledge of the facts. The number in a jury soon became fixed at twelve, who must agree on the verdict. If they failed they could be carted to the edge of the country and thrown into the ditch. To-day, on the other hand, a jury must be uninfluenced in its conclusions and is locked in a room until it reaches its decision. The unanimous vote is not required in some countries, and not always in England and America, nor is twelve always the number of members.

Though there is considerable opposition to the jury system, it still remains the best arm of the law. The principal objections are that it is too slow. At each session of court, a number of men are chosen, in the manner prescribed by the law of the community; from these each jury is selected. Either side has a limited right to challenge and reject those it deems unfit, and in the United States this feature is carried to extremes not permitted elsewhere, with a consequent great loss of time. The jury system has been adopted in modified form in Belgium, France, Germany, Italy and Spain.

Coroner's Jury. This jury serves principally to inquire into the causes of unusual deaths. Like the grand jury, it may declare that a suspected person should be held for trial for murder. Six men compose it. R.E.B.

Consult Train's *The Jury System: Defects and Proposed Remedies;* Forsyth's *Trial by Jury.*

Related Subjects. The reader is referred to the following articles in these volumes:

Battle, Trial by	Law
Coroner	Magna Charta
Courts	Ordeal
Crime	Procedure
Indictment	Thane

JUSTICE, *jus'tis,* **DEPARTMENT OF,** one of the executive departments of a government, although in some countries it is known by other names.

United States. When the Federal government was organized in 1789, Congress provided that there should be a Federal Attorney-

General. He was given a salary of $1,500 per year and out of this sum was supposed to pay the salary of an assistant. His duties were limited to advising the President and representing the United States government before the Supreme Court. As these duties required but little of his time the Attorney-General was not required to live in the capital city and was permitted to continue his private practice of the law. He was from the first by courtesy a member of the President's Cabinet, but at the same time was not at the head of an executive department as were the other Cabinet members.

With the development of the country and the growing importance of the legal arm of the executive branch there was organized in 1870 the Department of Justice on a basis similar to the other departments. The Attorney-General was placed at its head. The Department of Justice must not be confused with the *Judicial Department;* the latter refers specifically to the system of courts having jurisdiction over all cases in which the United States is a party; naturally the Department of Justice has close connection with the entire Judicial Department.

The Department of Justice is charged with the general superintendency of the eighty-six United States district attorneys and a like number of United States marshals of all the judicial districts; it examines the titles of lands needed for government purposes—for custom houses, forts, dockyards and the like—and administers the national bankruptcy laws. The Attorney-General either through his own office or through United States district attorneys conducts the prosecution of offenders against the laws of the United States. He makes an annual report to Congress of the business of his department, and may make suggestions with respect to new legislation needed. The head of the Department of Justice and his associates are not only the legal advisers of the President but of all the other executive departments; legal opinions in writing upon questions of law may be demanded by any department head; these opinions are published from time to time, and are regarded, next to the decisions of the courts, as authority on the points of law covered. The salary of the Attorney-General is now $12,000 per year. See ATTORNEY-GENERAL; CABINET.

Canada. The Canadian Department of Justice has two representatives in the Ministry, the Minister of Justice (who is also Attorney-General) and the Solicitor-General. Besides the duties of giving legal advice to the Governor-General and the government, and of administering justice throughout Canada, this department has the very important task of examining all the laws passed in all the provinces, so that the Governor-General may know when to exercise his veto power. It also administers prisons and penitentiaries and the secret service. E.D.F.

JUSTICE OF THE PEACE, a public officer of a township endowed with judicial powers for the purpose of preventing breaches of the peace and bringing to punishment those who have violated minor laws. Under the constitution of some states these officers are appointed by the executive; in others, they are elected by the people. The incumbent has judicial power only in certain petty civil cases. After arrest, a culprit is brought before the justice of the peace, and after hearing he is either discharged or held to bail to answer the complaint, or, for want of bail, is sent to jail. In some states where there are no criminal courts of record the justice of the peace acts only as a committing magistrate to bind the accused over to the grand jury, and he has no trial jurisdiction. In many large cities police magistrates take the place of justices of the peace.

JUSTINIAN I, *jus tin'i an,* in full, FLAVIUS ANICIUS JUSTINIANUS (483-565), called THE GREAT, was a Roman emperor of the East, whose reign was the most brilliant in the history of the divided empire. He was born in the village of Tauresium in Illyricum. In 518 his uncle, a Thracian peasant, became emperor under the name Justin I, and in 527 gave his nephew a share in the imperial power. When Justin died, a few months later, Justinian was crowned sole emperor.

He restored to the Roman Empire a part of its former possessions by victories in Persia, Africa and Italy, but began a labor of far greater importance when he turned his attention to the laws, and directed ten learned men to compile a new code. The result was the *Corpus Juris Civilis,* or *Body of Civil Law.* This and other legal works which the emperor caused to be published were the greatest contribution of the Roman intellect to the civilization of the world. Justinian is also famed as a builder, for he erected fortresses, harbors, monasteries and the celebrated Church of Saint Sophia at Constantinople. To obtain money for these public improvements, he bur-

dened the people with heavy taxes. He died in the thirty-eighth year of his reign at the age of eighty-three.

JUTE, *joot,* the cheapest of all known fibers, used extensively in making gunny cloth and sacks. This fiber is the product of two closely-related tropical plants of the same family as the basswood. They are natives of India, which produces the bulk of the world's supple of jute, are cultivated elsewhere in the tropics to a limited extent, including a small area in the Southern United States. The stalk grows to a height of twelve or fifteen feet, and bears no branches or leaves except near the top. After the first weeding the plant requires little attention. In India it is cut about three months after sowing, while it is yet in blossom. The stalks, stripped of leaves and branches, are tied in bundles and immersed in water until the fiber is loosened by the rotting of the outer bark. This process, called *retting,* takes from ten to twenty days. The stalks are then beaten to free the fiber from the bark, and the fiber is cleaned and dried. That which is designed for exportation is pressed into bales weighing 300 pounds and upward.

JUTE
Branch, leaves and seed.

Jute fiber is long, soft and lustrous, and can easily be spun into coarse threads. It is, however, weaker than hemp, does not bleach well, and when exposed to dampness it loses in strength. Aside from its use in the manufacture of gunny cloth, it is employed in the making of coarse curtains, chair coverings and other upholstery fabrics, carpets and burlap; the finest threads are sometimes employed in making imitation silk fabrics. The fiber is also made into fine and coarse twines, small ropes, sash cords and other forms of cordage. Jute butts, the short ends of the stalks, and the rough fibers rejected in the preparation of the fiber, are used extensively in paper making.

Over 125,000 tons of jute are imported annually into the United States. There are in the country over twenty establishments which make a specialty of the manufacture of gunny cloth. The value of their annual product is about $10,795,000. India jute sells for about 2¼ cents a pound, a price which makes jute production in the United States unprofitable. Though the plant thrives in the Gulf States, the American planter cannot compete with Eastern growers, because it costs the former vastly more to produce the fiber.

JUTES, *joots,* a Teutonic tribe from Denmark who assisted the Angles and Saxons in their conquest of England in the fifth century. According to the *Anglo-Saxon Chronicle* the first piratical band that landed on the island (A. D. 449) was a company of Jutes led by Hengist and Horsa. The three tribes took possession of most of the country except the western portion, now called Wales, into which

BOAT OF THE ANCIENT JUTES
Fairly well preserved in a Danish museum.

the remnant of the British population was forced to retire. The name of the Jutes is still preserved in the peninsula of Jutland, Northern Denmark. See ANGLO-SAXONS.

JUT'LAND, the only portion of Denmark which is a part of the continental area of Europe. The remainder of the country consists of islands. Jutland forms a peninsula having the Skager-Rak on the north, the North Sea on the west and the Cattegat and Baltic Sea on the east. It was known to the ancients as the Cimbric Peninsula, or Chersonesus (which see). The surface is low and is covered with dreary dunes and heaths, which may have had its effect on the temperament of the Jutlanders, a people of somewhat melancholy disposition. A continuous sandy beach runs along the west coast, and the east shore is indented with many bays and fjords. A railway line extends through the peninsula, connecting it with Prussian Schleswig on the south. Oats, barley, rye and beetroot are cultivated extensively, and the inhabitants are also engaged in cattle raising and dairying. These people have preserved the manners and customs of early times, and they speak the Danish lan-

e in its greatest purity. Jutland has an of 9,898 square miles, about the same as of Vermont. Population, 1911, 1,198,450.

LOCATION MAP

'VENAL, DECIMUS JUNIUS JUVENALIS, a us Roman poet and satirist, born at num, about A. D. 60. He was an accom- ed speaker during the first half of his After the accession of Trajan to the ıe in 98 he began to write satires in which escribed the conditions of life at Rome extraordinary force. His first nine poems ss in powerful terms his violent indigna- aroused by the corrupt Roman life that cnew; the remaining seven are moral s. Gifford and Dryden have translated of his satires, and Johnson has imitated of them in his *London* and the *Vanity of an Wishes.*

VENILE, *ju've nil,* **COURT,** a special for the trial of cases involving children have committed crimes or misdemeanors, herwise conducted themselves in a man- contrary to the public standards of pro- y. The juvenile court is the logical out- of modern methods of dealing with crime. not so many years ago that a child of en or fourteen, who stole a loaf of bread ıse he was hungry, would be given a jail nce. During his term of confinement he d be in constant association with grown many of them experts in crime—murder- hieves, forgers, wife-beaters, swindlers and criminals of all kinds. The prison sys- of the early nineteenth century was of a nature that it now seems almost as though the state had been deliberately trying to teach youthful offenders all it could about crime.

Society to-day recognizes that its methods of fifty or a hundred years ago were wrong. It recognizes the fact that children are seldom instinctively criminals, but that they violate the law usually as the result of bad example. The boy who plays baseball in a city street is technically a violator of the law, and he has sometimes been arrested for his fault; but to- day, even when the offense is a more serious one, there is a growing tendency to interpret the offense from the child's viewpoint. If the child is actually at fault it is the duty of so- ciety to prevent a repetition of the offense and, if possible, remove the cause. To do this it is necessary to keep the child from association with criminals, and so far as possible from the atmosphere which suggests crime. The care- free, often depraved crowds which fill the police courts are a harmful influence from which the child offender is shielded by the juvenile court. The prime objects of the juve- nile courts, therefore, are to separate the child offender from the adult, to make the courts an agent of reform as well as punishment, and to keep the child free, whenever possible, from the shame of a prison sentence.

The First Juvenile Courts. Various people and various countries have claimed the credit for establishing the first juvenile court, but the fact is that the institution is the result of gradual growth. The first step was taken by Massachusetts in 1869, in the form of a pro- bation law, but the law was not strictly en- forced. The idea of separate courts for chil- dren was first adopted in Adelaide, South Aus- tralia, in 1898, and in Toronto, Ontario, later in the same year. In the next year, 1899, the first juvenile court in the United States was established in Chicago. This court is not a separate organization, but a division of the Circuit Court. Denver has a juvenile court which was established in 1899 as a separate institution. Through the remarkable person- ality of its judge, Benjamin B. Lindsey (which see), this court has become perhaps the most famous juvenile court in the world. In 1903 the Denver court announced its right, under what is known as its chancery court powers, to appoint a woman as a sort of referee to sit with the judge in the trial of girl cases. In 1909 the Colorado legislature passed the first statute law confirming this practice. In 1913, in the absence of any such statute law, but

under chancery powers similar to those used by the Denver court, the Chicago court appointed a woman, with the title of assistant judge, to hear cases of girls. From Denver and Chicago the idea of the juvenile court spread rapidly, even to England and other European countries, but it is generally recognized as a distinctly American contribution to social progress.

How the System Operates. Whenever possible the judge places the juvenile offender on probation. This means, in short, that he is given another chance. He may be, and almost invariably is, required to report regularly to a probation officer. The latter visits the boy's or girl's home and investigates the conditions in which he lives. As a rule it is considered best to keep probationers at home, but there are some homes in which no child could grow up in decency and honesty. In such cases the judge, after investigation, sends the child to a reform school or similar institution. The probation officers in New York and a few other cities are paid by the city, but in many communities they are unpaid volunteers. Probably one-half of all the boys who are arrested are released on probation, one-fourth are sent to institutions, and nearly all of the remainder are released unconditionally. Among girls a larger percentage is sent to institutions, chiefly because a home which fails to keep a girl in the right path is in most cases a poor guarantee for the future. The experience of juvenile court judges indicates that good home influence rarely results in a girl's arrest. B.B.L.

Consult Flexner and Baldwin's *Juvenile Courts and Probation;* Breckenridge and Abbott's *Delinquent Children and the Home.*

THE WORLD BOOK
ORGANIZED KNOWLEDGE IN STORY AND PICTURE

Kk

K, the eleventh letter of the English alphabet, derived from the Phoenician *kaph*, which was in form a *K* turned backward. The name *kaph* means *hollow of the hand*, and it may be that in some way the letter form attempted to represent this, although the resemblance is not strong. The Greeks adopted the letter and called it *kappa;* when they began to write from left to right instead of from right to left, as did the Phoenicians, they turned it around, giving it practically its present form. In sound, also, it was identical with modern *k*. The Romans used *c* to represent the hard, guttural sound, and had in consequence no use for *k*, though they used it in a few foreign words. It was not until the Normans introduced in England the soft sound of *c* that *k* came to have any particular importance in the English language, but since that time it has been used in words in which the sound of *c* might be ambiguous.

K has only one sound in English, and is silent before *n*, as in such words as *knife*. It is frequently used after *c* at the close of a syllable to assure against mispronunciation, if a vowel follows. Thus *lack* would be correctly pronounced if the *k* were omitted, but the participles *lacking* and *lacked* would not be.

KAABA, or **CAABA**, *kah'a ba*, the most sacred shrine of Mohammedanism, toward which Mussulmans turn their faces in prayer. It is a cube-shaped, flat-roofed building, in the center of the Great Mosque at Mecca. In the northeast corner is set the famous "black stone." This stone is of irregular oval shape, about seven inches in diameter and probably of meteoric origin. When Mohammed returned triumphantly to Mecca, he destroyed all the idols found in the Kaaba, which had fallen into pagan use, but spared the "black stone" which has since been held in extreme veneration by all Mussulmans.

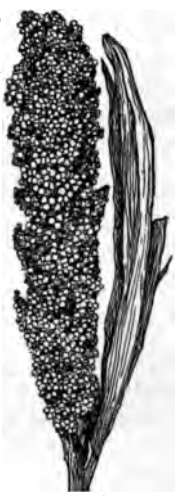
KABUL, or **CABUL**, *kah'bool*, or *ka bool'*, an ancient city, the capital and largest city of Afghanistan, situated on the Kabul River, about 300 miles northeast of Kandahar. The city is divided and subdivided by walls with narrow gates, and it has an arsenal and a mint. Carpets and shawls are manufactured, and large quantities of fruit are grown in the vicinity. Caravans journeying between Persia and India pass through the city. In it is published the *Court Gazette*, the only newspaper printed in Afghanistan. From Kabul, in 1880, Lord Roberts started on his memorable march to Kandahar. It was taken by the British in 1839 and again in 1879. Population, about 150,000. See AFGHANISTAN, subhead *History*.

KADIAK, or **KODIAK**, *kahd yak'*, the largest of the Alaskan group known as the Kadiak Islands, situated east of the Alaska Peninsula, and separated from it by Shelikof Strait. It has an area of about 36,000 square miles, nearly as great as that of the state of Indiana. Lumber is abundant, the harbors are good and salmon is caught in great quantities. Cattle farming was recently introduced with success by the United States Department of Agriculture. The largest species of bear in the world, the Kadiak, is found on this island. Karluk, with 550 inhabitants, is the largest town. See ALASKA.

KAFFIRS, *kaf'erz*, meaning *unbelievers*, is a word applied by the Arabs of Africa to the fighting races with whom they come into conflict in Southeastern Africa. It is now limited

to the tribes inhabiting Zululand, a part of Portuguese East Africa, and the whole of Natal. Kaffirs live in conical-shaped huts, with a ground plan from fifteen to twenty feet in diameter and one opening two feet high by eighteen inches wide, which serves as door, window and chimney. Their food is corn meal mush (mealie), with an occasional addition of fresh beef. The men raise cattle and engage in hunting, while the women of the tribes do the garden and field work. Kaffirs are lighter in color than the negroes, and their heads are shaped more like those of Europeans. See ZULULAND.

KAFIR CORN, or **KAFFIR CORN,** *kah'fer* or *kaf'ir,* is a variety of sorghum, belonging to the grass family. It contains no saccharine, or sweetening principle, and is called *grain* sorghum to distinguish it from the sweet sorghums from which syrup is extracted. Kafir corn was first raised in the south-central part of Africa, in Kaffraria, a region inhabited by the tribe known as Kafirs. It reaches a height of from five to ten feet, and bears a heavy head full of grain. It has been raised in the dryer portions of the United States with great success and is now a staple product in the West. The yearly crop from American farms is worth $12,000,000. Kafir corn contains a large percentage of starch, and is desirable as a fattening food for live stock.



KAFIR CORN

KAISER, *ki'zer,* from the Latin *Caesar,* in reference to Caius Julius Caesar, is the German word for *emperor.* The custom of adding *Caesar* to the name of the ruling Roman sovereign was legalized by Diocletian and spread to Germany after the division of the Roman Empire. Thereafter the custom languished, but was revived by Charlemagne in 800. When William I of Prussia became German emperor in 1871 he assumed the title, which has passed to his successors. In point of present-day interest the most remarkable of the German kaisers is William II, who came to the throne in 1888. The Russian title *czar* comes from the same root word.

KAISER-BLUME, *ki'zer bloo me,* **CORNFLOWER** or **BATCHELOR'S BUTTON,** an annual plant whose long, slender stem, from two to two and a half feet high, bears a shaggy, ragged-looking flower, usually of a shaded-blue color. In Central Europe this flower is a weed, and infests the wheat fields.

The Kaiser-blume has many stories told of it. When Louise of Prussia was escaping from Berlin at the advance of Napoleon's army, she kept her children quiet and comfortable by making chains of cornflowers for them. One of the children afterward became Wilhelm I, and he, in remembrance of the day, proclaimed the cornflower the national flower of Germany; from this incident it gets its name Kaiser-blume, or *Kaiser's flower.*

It is also sometimes called *Centaurea,* from the legend that Chiron, the Centaur, healed the wounds of Hercules with it.

KAISER WILHELM, CANAL, more popularly known as the KIEL CANAL, is a notable German waterway. It extends in a southwesterly direction across the lower part of the peninsula of Schleswig-Holstein, connecting the Baltic and the North seas. The length of the canal is a little over sixty miles, and it shortens by 200 miles the trip around Denmark. At the eastern end, on the Baltic Sea, is Schönberg, close to Kiel; the latter is the naval headquarters of the German Empire. At the western end, which opens into the mouth of the Elbe River, is

KAISER WILHELM CANAL

Brunsbüttel, near the newer naval base of Wilhelmshaven. The ports are connected by rail with the large manufacturing cities of the country.

The first work on the Kaiser Wilhelm Canal, whose great advantage was foreseen by Bis-

cost $39,000,000. It was begun in 1887, hen finished in 1895 was 190 feet wide at rface and 29.5 feet deep. When dread- s were built for the navy it was found nal was not large enough to accommo- hem. Accordingly it was enlarged, being 140 feet wide at the bottom, 330 feet it the surface and thirty-six feet deep, largest warships could pass through. the second completion of the canal it was ly opened by Emperor William II on 24, 1914, six weeks before the War of ations began. When this conflict broke e canal was ordered closed to commerce he conclusion of hostilities. H.M.

AHARI, *kah lah hah're,* **DESERT,** a of central Southern Africa, occupying of Bechuanaland and part of the former in Southwest Africa. It is a basin per- 00 miles wide and 600 miles long, and vated over 3,000 feet above the sea. parts of it are thinly covered by tufts of other parts with scrubby trees. The s include both Bushmen (which see) and -called Ba-kalaharis, who grow water- s and pumpkins and have herds of goats. baboon, buffalo, gnu, hippopotamus, gi- leopard, lion, rhinoceros, elephant and are among the animals native to the . On the map appear a few lakes, in- g Lake N'gami at the northwest, but are only shallow salt ponds, which re- the drainage of the rains which fall on ater edges of the desert. Artesian wells been bored in a few places by the British. Kalahari was the scene of part of Living- s journeys.

AMAZOO, *kal a ma zoo',* MICH., an im- t railway center in the southwestern of the state, noted for its celery-raising ry. It is situated on the Kalamazoo , in Kalamazoo County, of which it is ounty seat, twenty-eight miles west of Creek, fifty miles southeast of Grand s and 104 miles northeast of Chicago. portation is provided by the Michigan al, the Grand Rapids & Indiana branch Pennsylvania System, the Grank Trunk he Lake Shore & Michigan Southern. ic service is provided to cities as far as Grand Rapids and as far east as De-

In freight and express tonnage Kala- ranks third in the state, being exceeded by Detroit and Grand Rapids. The popu- increased from 39,437 in 1910 to 48,886 ral estimate) in 1916; about 16,000 are foreign born, of whom 12,000 are Hollanders. The area is eight square miles.

Parks and Drives. Kalamazoo is located on both sides of the Kalamazoo River, which winds its way through a rich agricultural valley. From the river, broad, tree-shaded avenues lead to the highlands, where some of the public institutions and beautiful residences are situated. The park system comprises eighty-five acres. In the heart of the city is Bronson Park, with its "mound," a relic of the Mound Builders; Milhom Park, Recreation Park and Oakenwood Park are among the other pleasure and recreation grounds.

Buildings and Institutions. The most notable buildings are those of the educational institutions, among which are the Western State Normal School, with its spacious grounds, Kalamazoo College, Nazareth Academy, the New Central high school and East Avenue school. Besides these, the city has several parochial schools, business colleges, Barbour College for boys and two branch libraries. Public buildings worthy of mention are a courthouse, with its park, a post office, and the Van Deusen Library, with 48,000 volumes. The State Asylum for the Insane is located here.

Industry and Manufacture. The celery-raising industry, for which Kalamazoo is famous, employs several hundred people, chiefly Hollanders, and the annual output amounts to about $2,000,000. In the line of manufacture it is equally well known, as the fame of its paper mills, which employ 6,000 people, has traveled far. Sixteen of these mills are located in Kalamazoo and vicinity, 1,200 tons being the normal daily output. The allied paper industries are also important and extensive; these include envelope, paper-box, label and stationery factories. Two of the seven playing-card factories in the United States are located here. Few cities of the size of Kalamazoo have such varied products, from heavy boilers and engines to automobiles and accessories, foundry products, garments, sporting goods and musical instruments. The Kalamazoo River furnishes abundant power for manufacture.

History. The first settlement was made in 1829 by Titus Bronson, and named Bronson, in his honor; his original home is in a park which bears his name. There are many legends as to the origin of the name the city bears at present; the accepted one is that it is an Indian name signifying *Place of the Boiling Pot,* as in the vicinity occur hundreds of bubbling little springs. Though the name is rhythmic and

falls merrily on the ear, no other city has taken it or any variation of it. Kalamazoo was incorporated as a village in 1843, and received its city charter in 1884. O.B.T.

KALEIDOSCOPE, *ka li'doh skope,* a name derived from three Greek words, *kalos,* meaning *beautiful; eidos, form,* and *skopeo, I see.* A kaleidoscope is an instrument with which we see objects in beautiful forms. It is an optical toy, invented by David Brewster in 1817, consisting of a tube within which are three glass plates that serve as mirrors. These plates extend the whole length of the tube and make an angle of 60° with one another. The tube is closed at one end by a metal plate, with a small hole in its center, and this is known as an eyepiece. At the other end there are two glass plates, one being of clear glass and the other of ground glass, the one of clear glass being closer to the eye. Fragments of colored glass or beads lie between these plates, which is called an *object-box.* When the tube is slightly shaken and the eye is applied to the aperture, symmetrical and beautiful figures are produced by the mirrors. No two figures are ever quite alike. Designers often make use of this instrument to give them patterns for carpets, wall paper, and designs for various fabrics.

KALMIA, *kal'mi a,* a group of North American evergreen shrubs of the heath family, of which the best known is the popular and beautiful *mountain laurel.* This ornamental plant ranges from New Brunswick to Louisiana, but flourishes most abundantly in the Alleghany Mountains. Its dark, glossy leaves, pointed at the ends and oblong in shape, are used in large quantities in making wreaths, for they are highly decorative in effect. Mountain laurel grows from three to thirty feet in height, and is often found in thickets so dense that one cannot pass through them. The flowers are bowl-shaped, with five short, broad lobes, and are pink, white or purple in color. Because of its beautiful blossoms and foliage, the laurel is often found in parks, and is utilized in landscape gardening.

KALMIA

Another species of kalmia, which grows in northern swamps, bears pale-lilac blossoms; under the name of mountain laurel this is the state flower of Connecticut. Sheep laurel, ranging from Newfoundland to Georgia, is a small species of kalmia whose leaves are poisonous to sheep.

KALMUCKS, or **CALMUCKS,** *kal'muks,* a western branch of the Mongolian race, originally were inhabitants of Central Asia, but now dwell not only in many parts of the Chinese Empire but also in Western Siberia and Southwestern Russia. They are a wandering people, notwithstanding the numerous efforts of the Russian government to develop them into agriculturists. They are brave warriors and daring horsemen, and many of them are members of famous Cossack regiments in the Russian army. A full-blooded Kalmuck is short of stature and broad-shouldered, with a large head, straight black hair, and a flat, round face with marked Mongolian characteristics. With the exception of a small number of Christians and Mohammedans, the Kalmucks are Buddhists.

KALSOMINE, a form of the word *calcimine,* but lacking good authority. See CALCIMINE.

KAMCHATKA, a large peninsula in the northeastern part of Asia, which, together with the Kurile Islands, almost completely separates the Sea of Okhotsk from the Pacific Ocean. It is larger than the state of Colorado, having an area of 104,433 square miles. A range of volcanic mountains extends from north to south, and the highest point on the peninsula, the extinct volcano, Mount Itchinskaya, is 16,920 feet above the sea. Petropavlovsk, the capital, is situated on one of the finest natural harbors in the world. The climate is severe, winter extending over a period of nine months, and frost being frequently felt even in summer. Bear, sable, fox, beaver, otter, seal and salmon abound and the dog is the only domestic animal. Hunting and fishing are the chief occupations of the inhabitants, consisting principally of Kamchadales and Russians. Population, about 7,500.

LOCATION MAP

KAMERUN, or **CAMEROON,** *kah ma roon',* a German protectorate of West Africa, which

was taken by the British during the progress of the War of the Nations. It lies between French Congo on the east and British Nigeria on the west and extends from the Atlantic coast northeastward to the southern shore of Lake Chad. It is roughly triangular in shape, with the northern extremity the apex.

LOCATION MAP

The frontier between Nigeria and Kamerun was settled by an agreement signed in London in 1913. The seat of government is at Buea, the government being administered by a governor and local council. The most important trading towns are Duala, Rio del Rey, Kribi, Victoria and Campo; Belltown and Aquatown are the largest native settlements. There are four government schools. Bantu negroes live near the coast; Sudan negroes, inland. Including 107,270 square acres ceded by France in 1911, Kamerun has an area of 298,400 square miles; it is therefore larger than Texas.

The coast region has a fertile soil, and there are valuable plantations of cocoa, coffee and rubber. There is also an active trade in palm oil and ivory. Experiments have recently been made in Victoria in the cultivation of vanilla, cloves, ginger, pepper and other products. The colony is rich in hardwood, and ebony is abundant. Iron and gold are found, and cattle-raising is successfully carried on. There are about 150 miles of railway lines in operation; other proposed lines were halted by the War of the Nations. In 1913 a cable to Germany was opened. The white population is 2,000; the natives number nearly 3,000,000.

KAM'LOOPS, a city in British Columbia, the chief settlement in the Thompson Valley, a port of entry and the judicial center of the Yale District. It is situated at the junction of the north and south branches of the Thompson River; its name is an Indian word for *confluence.* It is a division point on the main line of the Canadian Pacific Railway, about midway between Vancouver and the Alberta boundary; the former is 250 miles by rail to the southwest, and the latter is 273 miles east. Kamloops is also served by the Canadian Northern Railway, which has established a division point at Kamloops Junction, three miles away, and runs its trains to Kamloops.

Kamloops is the supply center for a large mining, ranching and hunting district. It is also the governmental center, and in addition to the county court has a Dominion lands office and a provincial registry office. A $500,000 hydroelectric plant is owned by the city. Kamloops was founded in 1811 as a trading post of the Northwest Company, and a permanent settlement was not established until a decade later. It was incorporated as a city in 1892. In the early days it grew slowly, but after the mines in this region were opened it prospered rapidly. Population in 1911, 3,772; in 1916, estimated, 5,000.

KANAKAS, *kan'a kahz,* or *ka nak'ahz,* the Hawaiian word for *men,* is the name at first applied by white sailors and traders to the native inhabitants of the Hawaiian Islands and later to all slaves, contract laborers, etc., of the tropical Pacific islands, without distinction of origin. The word now is used in the sense of "coolie," "contract laborer," etc., but has no vogue except in Pacific islands.

KANE, ELISHA KENT (1820-1857), an American physician who became famous as an Arctic explorer, was born at Philadelphia, Pa. Shortly after his graduation in 1842 from the medical school of the University of Pennsylvania, he became surgeon to the American embassy in China. After extended travels through India, Egypt and the continent of Europe he returned to America in 1846, and was employed in the government survey of the Gulf of Mexico. In 1850 he was appointed senior medical officer to the Grinnell Expedition in the unsuccessful search for Sir John Franklin (which see). On the return of the expedition Kane published *The United States Grinnell Expedition in Search of Sir John Franklin—a Personal Narrative.* In 1853 he resumed the search, and the *Advance,* under Kane's command, remained frozen in the ice for twenty-one months in latitude 79° nŏrth. The ship was finally abandoned on account of scarcity of provisions, and the party pushed on to the Danish settlements in Greenland, about 1,300 miles distant, in boats and sledges. Kane reached New York in November, 1855. In 1856 he published *The Second Grinnell Expedition.* Failing in health he sailed for Cuba, and died there.

KANGAROO, *kang ga roo',* the native name of a curious, strangely-shaped animal of Australia and neighboring islands. There are forty known species, varying in size from that of a hare to a height of seven feet. The kangaroo

seems strangely out of proportion, with its small, deerlike head, short, slender forelegs, large, powerful hind legs, and tails long and thick at the base. The ears are large and upright; the upper lips are cleft. So sharp are the teeth that the animal clips off grasses, leaves and other herbage so closely as to cause great damage to crops. The hands of the forelimbs are naked beneath, and each has five sharply-clawed fingers. On the strong hind legs are long, four-toed feet, each armed with one especially-developed claw with which the animal can effectively defend itself.

The usual attitude of the kangaroo is an upright position, resting on the hind legs and powerful tail. Timid and alert, with senses very keen, at the slightest sign of danger it jumps rapidly away in leaps often exceeding three or four times its length.

Kangaroos are pouched animals, or marsupials (which see). That is, their young, numbering from one to three at a birth, are born when very tiny and undeveloped, and are immediately placed by the mother, by means of her forepaws or teeth, in a breast-pocket-like pouch, where she nourishes and cares for them for weeks, or sometimes months, until they are ready to hop about as their parents do. The fur of kangaroos is soft and of a gray-brown color. The hides are valued for shoes, gloves and bags, and the flesh is considered a delicacy by the natives. For that reason, and to protect crops when the animals become pests, they are extensively hunted. Kangaroos are timid and gentle in captivity.

Species. The kangaroo of the zoo, the best-known species, is the *gray kangaroo,* also called *old man, boomer* and *forester.* The *great red kangaroo* is larger, and the neck of the male is tinged with red. *Tree kangaroos* are small species which live in the forests of New Guinea, feeding on fruits, bark and leaves. Some of the smaller kangaroos, which live in the brush, are known as *wallabies.*

KANKAKEE, *kang ka kee',* ILL., the county seat of Kankakee County, and an important distributing and manufacturing center of Northern Illinois, situated in the northeastern section of the state, on the Kankakee River. Chicago is fifty-four miles northeast. The Illinois Central, the Cleveland, Cincinnati, Chicago & Saint Louis and the Chicago, Indiana & Southern railways meet here, and an electric line extends through adjacent cities to Chicago. Kankakee was settled in 1853, was incorporated in 1854 and was given a city charter in 1892. French and Germans comprise two-thirds of the population, which increased from 13,985 in 1910 to 14,230 in 1916 (Federal estimate). The area of the city exceeds three square miles.

KANGAROOS

Male and female, and characteristic attitude of one of the animals at bay, fighting his pursuers.

At Kankakee the river is broad and deep and provides power for manufacturing purposes, for lighting the city and for operating the street railways. There are large knitting mills here, employing about 700 people, besides manufactories of pianos, furniture, sewing machines, plows and starch. The surrounding country is rich in agricultural products, and limestone is found in the vicinity.

Kankakee is the seat of the Eastern Illinois Hospital for the Insane, the establishment of which demanded $2,000,000. The city has a $300,000 courthouse, a Y. M. C. A. building, a $65,000 City National Bank building and an $85,000 post office. Besides the public schools there are Saint Joseph's Seminary, the Conservatory of Music, a business college and a public library. At Bourbonnais (three miles distant) are located Saint Viateur's College, one of the best-known Roman Catholic theological schools in the West, which has been in existence since 1868, and the Notre Dame Academy, another Roman Catholic institution. D.P.C.

KANSAS, the central commonwealth in the American Union, a great state whose sunflower-grown prairies have given it its state flower and its popular name of the *Sunflower State*. It is also known as the *Jayhawker State*, from some term of obscure origin which was current in the days of the slavery controversy, and, in reference to its position, as the *Central State*. Its official name is taken from that of a tribe of Indians who formerly roamed its prairies.

Except in the northeast, where the windings of the Missouri River cut off a corner, Kansas is a rectangle. From east to west it measures 408 miles, from north to south 208 miles, and it has an area of 82,158 square miles, of which 384 are water surface. Thus it ranks in area thirteenth among the states of the Union, while in population it is twenty-second, most of the states which are larger lying to the west of it, and those which are more populous, to the east.

The People of Kansas. Kansas had in 1910 a population of 1,690,949, while the estimated population January 1, 1917, was 1,840,707. At the last Federal census, therefore, it had an average density of 20.7 to the square mile, in which respect it was thirty-second among the states. The number of inhabitants to the square mile is much greater in the east than in the west, where the arid plains will not support a large population. Kansas is not to an important extent an immigrant state, over ninety per cent of the population being American born; but Germany, Russia, Sweden, Austria and England are fairly well represented. There are more negroes than in most of the other Northern and Western states, for in the troubled times succeeding the War of Secession many colored people flocked into the state; in fact, Kansas has, as befits its central location, a very representative population, settlers from practically every part of the South and East having found their way to it in its "boom" days.

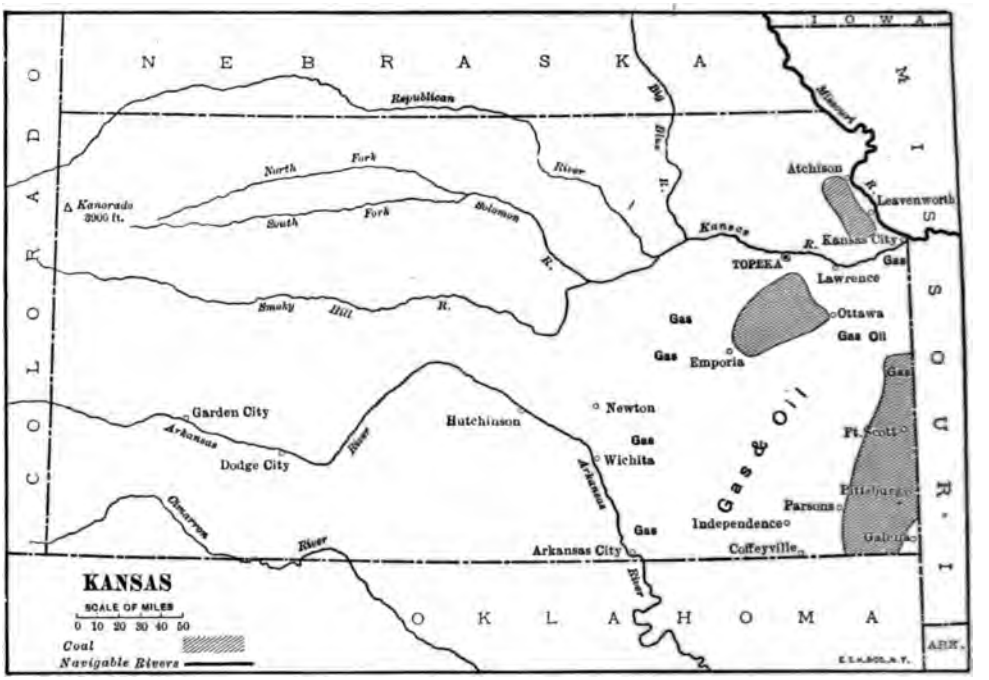
The people in the country far outnumber those in the towns; only about one-fourth of the people live in towns of 2,500 or over. There are no large cities, but a number of very progressive smaller ones, of which Kansas City, adjoining Kansas City, Mo.; Wichita, the second largest town; Topeka, the capital; Atchison, Leavenworth, Hutchinson, Pittsburg, Coffeyville, Parsons, Lawrence, Independence and Fort Scott, are prominent.

Education. From the beginning of its history Kansas showed a keen and intelligent interest in education, and few states have more efficient or more generously-supported school systems. The problem has not been easy, owing to the large rural population, but it has been so well met that only 2.2 per cent of the population are illiterate, Kansas ranking fifth in this respect among the states.

The school system, at the head of which is a state superintendent of instruction, includes, in addition to the numerous grammar schools, nearly 400 public high schools; the development in secondary education during the last decade has been remarkable. At least half of these high schools have normal training courses, and more than a quarter of them give such systematic instruction in agriculture as the rural population needs. In many of the rural schools, a large number of which are on the "consolidated" plan (which makes it possible

by accommodating larger districts to afford better instruction), there is work of high school and even of normal grade. Normal schools are in operation at Emporia, Hays and Pittsburg.

Among the institutions of higher learning are the state university at Lawrence; the state agricultural college at Manhattan; and such private institutions as Baker University at Baldwin, the College of Emporia at Emporia, Fairmount College at Wichita, Friends University at Wichita, Ottawa University at Ottawa and Washburn College at Topeka.



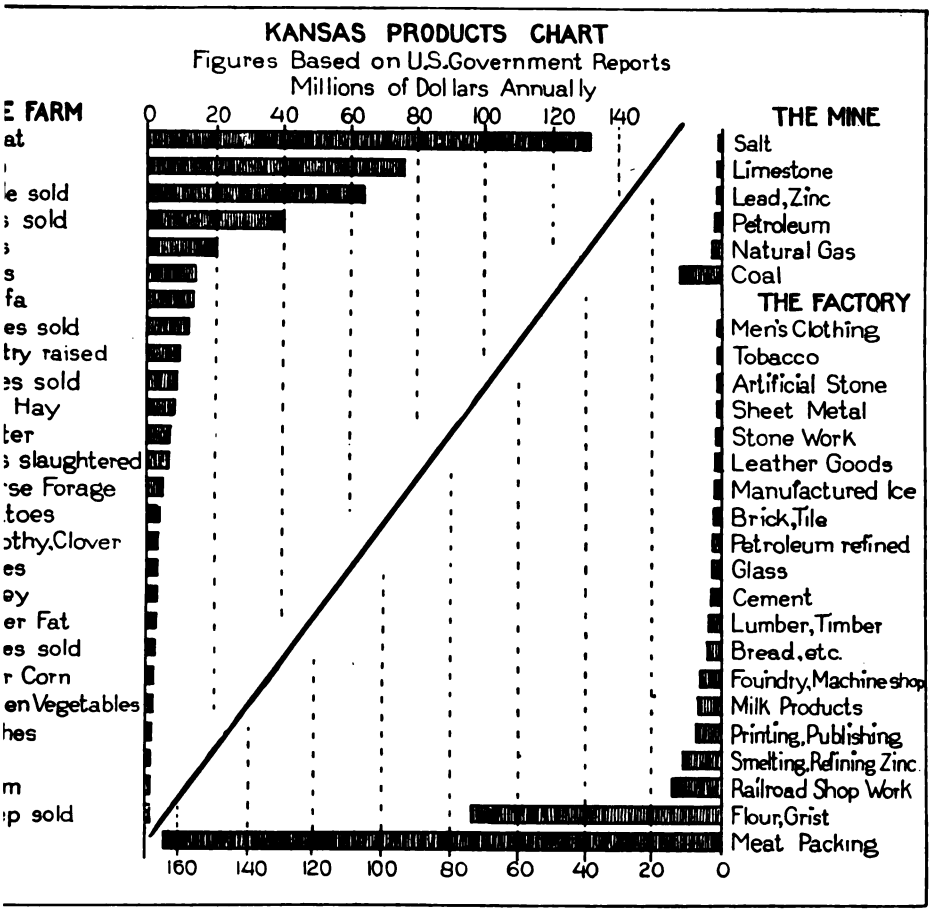
OUTLINE MAP OF KANSAS

Showing boundaries, location of principal cities, rivers, coal deposits and supply of natural gas, and the highest point of land in the state.

Religion. Of the church communicants, who include somewhat more than one-fourth of the population, approximately one-fourth belong to the Methodist Church, the strongest religious body in the state. No other Protestant Church has half as many members, but the Roman Catholics number over 93,000. The Friends, or Quakers, are well represented, and there are several communities of Mennonites.

Physical Features. *Surface and Soil.* Kansas is one of the prairie states, and almost its whole surface is a gently rolling plain, with occasional rounded hills which never reach a greater height than 500 feet above the surrounding country. But there is a difference in the plains. In the east they are part of the central prairie region; in the west, of the great plain which forms one of the steps up toward the Rocky Mountains. The slope is so gentle, however, that a person traversing the state does not realize that at the eastern boundary he is but 800 feet above sea level, while at the western he has risen to almost 4,000 feet. The lowest point, in the southeast, is 725 feet in altitude; the highest, on the western border, 3,906 feet; and the average for the state is 1,800 feet. Throughout the state there is little rugged scenery save along the Missouri River, where sheer bluffs rise to heights of 200 feet, and in the valleys of a few other rivers in the east, which are so sharply worn away as to be almost gorges.

The northeastern part of Kansas lay ages ago in the region of glaciers (see GLACIAL PERIOD), and like all other glaciated areas it has a very rich soil, but really no better than that of the rest of the state. Each section has its own particular excellence, even the west, where water famine interferes with agriculture, possessing a wonderfully fertile soil. The seller of commercial fertilizers finds small market for his wares in Kansas.



ers. Owing to the gentle, even land the drainage of Kansas is good. All the have an eastward flow, and many of a slight southern trend as well. The uri, as stated above, crosses the northorner, and into it flows one of the two rivers of the state, the Kansas, which, s tributaries, drains all the northern part. among the rivers which empty into it are epublican and the Smoky Hill. In the the chief river system is that of the sas, which includes as tributary streams alnut, the Pawnee and the Little Arkan- There are, also, flowing out of the state e south, the Verdigris and the Neosho, of which join the Arkansas after crossing ate line. Of lakes, Kansas has practically

traveler through Kansas can follow the of a river in the distance by the rows s which border it, for, save in such locathere are few trees. The Federal government, however, has interested itself in the question of forests, and has, with excellent success, planted considerable areas, especially in the arid sections.

Climate. Kansas has a very healthful climate, chiefly because of its dryness. Clear skies, bright sunshine, cool nights even in summer when the days are hot, fairly mild winters—these are the pleasant features. The most unpleasant is the high wind, which in summer is likely to be dust-laden. In the northern part of the state the average yearly temperature is 52°, in the southern, 58°; the ordinary range in the course of a year is from 10° below zero to 100° above.

Little snow falls, and the average rainfall is but twenty-seven inches. This is very unevenly distributed, the eastern third having from forty to forty-four inches, and the extreme western sections from ten to twenty.

Agriculture. The chief resources of Kansas are its fertile soil and its favorable climate,

which permit the growing of almost all temperate-region crops, except in the western part, where the rainfall is inadequate. Agriculture is the chief industry, and agriculturally Kansas is one of the leading states of the Union. With respect to products, the state divides itself naturally into three sections of nearly equal size. In the east the crops are fairly general, corn, oats, rye, potatoes, sorghum, hay, flax and fruit flourishing, but the most important of these is corn, of which considerably more than 100,000,000 bushels are produced in the state each year. Among the fruits apples hold first place, bringing the state from $2,000,000 to $5,000,000 a year. In the five years from 1909 to 1913 the peach crop averaged only 315,000 bushels, but in the next year was 1,760,000 and in the year following, 2,516,000 bushels, worth $1 a bushel.

The central belt is devoted to wheat, chiefly of the winter variety, and this is the most extensive crop of the state, as regards acreage, amount and value; from 100,000,000 to 200,000,000 bushels are harvested each year. Westward are the arid lands, no less fertile but considerably less productive. Time was when this region was far more thickly populated than at present, for occasional years of abundant rainfall encouraged people to settle there and plant crops; but year after year of drought brought great hardship, and to-day comparatively few crops are grown there save in the stream valleys, where irrigation is practiced. But to the raising of live stock this grass-grown region is well suited, and vast numbers of cattle are sent each year to the slaughtering houses in Kansas City. Dairying, too, is an industry of importance, while sheep, horses, swine and poultry are raised in ever-increasing numbers.

Over eighty per cent of the area of the state is farm land, and of this over sixty per cent is improved. The farms are, in general, of considerable size, 244 acres being the average, and almost two-thirds of them are operated by their owners.

Minerals. The mineral resources of Kansas are by no means insignificant, even though the state has no mountains which conceal great veins of the precious metals. Fuels are the most important mineral yields—coal and natural gas ranking first, followed by petroleum. Coal, which is of the bituminous variety and of excellent quality, is mined largely in the southeast, and the total yearly output is about 7,000,000 short tons. Local needs are thus well supplied, and a surplus is left for shipment. For a time it seemed that the supply of natural gas was almost unlimited, but the high-water mark was reached in 1909, when the yield was valued at more than $7,000,000; since then there has been a gradual decrease, and a number of industries have suffered from this lessening production. While not one of the chief producers of petroleum, Kansas has an output of two or three million barrels a year.

Zinc, in the production of which it ranks sixth among the states of the Union; Portland cement; lead, the mining of which is largely incidental to that of zinc; excellent building stone in great quantities; gypsum; salt, of which only three states produce more, and clay and chalk are the other mineral products of importance. But it cannot be said that the mineral output of Kansas is increasing.

Manufactures. Without timber and without deposits of iron, Kansas is limited in its materials for manufactures, but out of its agricultural resources have grown manufacturing industries of great importance. Long one of the very lowest of the states in the value of its manufactures, it had advanced by the second decade of the twentieth century to the fourteenth place, almost entirely as a result of its agricultural growth. The chief of its manufacturing industries are those connected with slaughtering and meat-packing, which have their center at Kansas City, Kan., and which are excelled in value only by those of Illinois. This industry, with that of flour and grist milling, in which Kansas ranked third among the states, at the Census of 1910, makes up nearly three-fourths of the total manufactured products of the state.

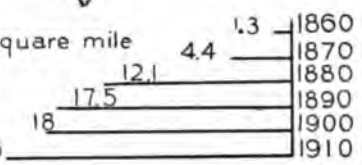
The building and repairing of railroad cars, the extensive manufacture of butter, cheese and condensed milk, the smelting and refining of zinc and the making of glass are other industries of importance. Over half of the manufactured products of the state are made in Kansas City, but Wichita and Topeka have a growing industrial life.

Transportation. Its central position has given Kansas a decided advantage in the matter of railroads, for a number of the great trunk lines which connect the east with the west and south pass through it. In the eastern and central parts these are so well supplemented with cross lines that the transportation facilities are unusually good, and only in a few localities in the west, where population is

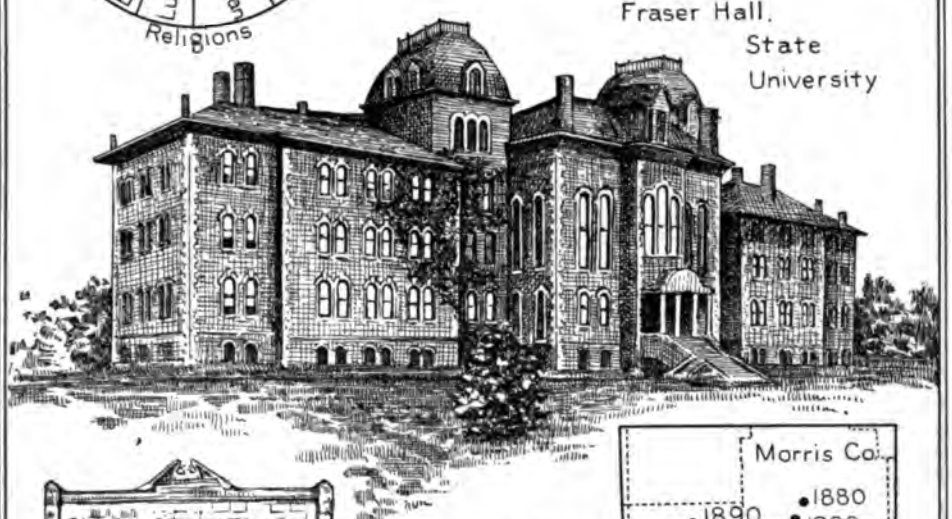
KANSAS

★Geographical Center of the United States

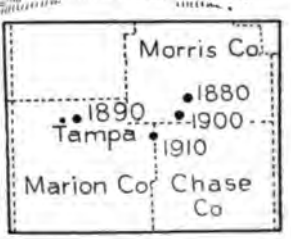
People per square mile by decades



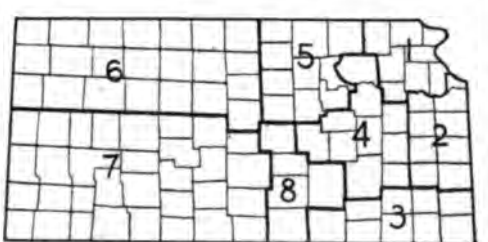
Fraser Hall, State University



Something Kansas boys and girls have never seen



Center of population



Congressional Districts

sparse, is there any lack. The state has about 12,345 miles of railways, of which almost a third is owned by the Atchison, Topeka & Santa Fe. Other roads with a considerable mileage within the state are the Chicago, Rock Island and Pacific, the Saint Louis & San Francisco, and the Missouri, Kansas & Texas.

Of water transportation there is little, only the Missouri River on the northeastern frontier being navigable.

Government. Kansas is governed under a constitution which dates from 1861, but which has been amended several times. The procedure with regard to amendments is about as in other states; either house of the Legislature may propose them, both houses must approve them by a two-thirds vote, and a majority of the voters of the state must ratify them.

The legislative body consists of two houses —a Senate of not more than forty members, elected for four years, and a House of Representatives limited to 125 members, chosen for a two-year term. Sessions of the Legislature are held every other year.

The chief executive officer is the governor, the rest of the department consisting of a lieutenant-governor, secretary of state, auditor, treasurer, attorney-general and superintendent of public instruction, all elected for two years. The governor possesses the pardoning and the veto power, the latter extending to separate items of an appropriation bill.

At the head of the judicial system is a supreme court of seven judges, who hold office for six years. Below this are the district courts, each headed by a judge elected for a four-year term; the probate courts, one in each county; and, at the bottom of the system, the justice courts. The larger cities have special city courts.

Special Provisions. Kansas has always been well to the front in progressive legislation. It has pure food laws, a law forbidding the white slave traffic, laws regulating child labor and forbidding the use of tobacco by minors and the sale of cigarettes, railroad-rate laws and direct primary laws. The commission form of government for cities is provided for, and most of the large and many of the smaller cities have put it into operation. Since 1880 Kansas has been conspicuous as a prohibition state, and both temperance and anti-temperance orators have pointed to it to illustrate their arguments. Kansas people are proud of the fact that few children of the state have ever seen an open saloon. By an amendment to the constitution passed in November, 1912, the right to vote is extended to women on the same terms as to men.

Institutions. Two state boards, one for charities and one for corrections, have charge of the institutions of the state, and these also supervise such private institutions as receive aid from the state. The charitable institutions include three hospitals for the insane, at Topeka, Osawatomie and Larned; a hospital for epileptics at Parsons and a home for feeble-minded at Winfield; a school for the blind at Kansas City, one for the deaf at Olathe, and an orphans' home at Atchison. In the penal institutions the indeterminate sentence is in force—that is, those convicted of crime or misdemeanor are held until it seems to the authorities that they may be trusted to mingle again in society. Among the penal institutions are the state penitentiary at Lansing, an industrial home for boys at Topeka, one for girls at Beloit, and a reformatory for young men at Hutchinson. Near Leavenworth there is a Federal prison.

History. *The Early Years.* Kansas has had some very interesting and romantic chapters in its history, which began, so far as the white men were concerned, in 1541, when the Spanish explorer, Coronado, journeyed across the territory. His discoveries were not followed up, and the land was left in the possession of the Shawnee, Osage and Omaha Indians for over two centuries. Frenchmen visited it in 1719, but they, too, merely passed through, leaving no mark but assuming nominal ownership in the name of France. With the purchase in 1803 of the vast territory of Louisiana, the United States gained possession of most of the present state of Kansas, the rest coming as a grant from Texas in 1850. Lewis and Clark, Pike and Long all explored the region, but brought back no glowing tales of it, describing it all as a part of the "Great American Desert, a useless waste of sand."

The first white settlement was made in 1827 at Fort Leavenworth, but even before that trade was begun with New Mexico over the famous old Santa Fé trail. When the rush to California and Utah began in the "forties," Kansas lay on the line of march, and an almost endless train of "prairie schooners," great canvas-covered wagons, crossed the territory. Gradually it came to be known that much of the region was most promising, and some of the "prairie schooners" came to anchor there

RESEARCH QUESTIONS ON KANSAS

(An outline suitable for Kansas will be found with the article "State.")

How many states are larger than Kansas? How many have a greater population? Where are most of the larger states? Most of the more populous?

Why would it not be very profitable to set up in Kansas a plant for the manufacture of fertilizers?

What substance that appears on the table with every meal is produced in great quantities in this state?

How did this territory come into the possession of the United States? How did the early explorers describe it?

How many people are there to the square mile? Is this density greater or less than that of the country as a whole?

How does it happen that Kansas has so large a negro population?

As you travel across the plains of Kansas, how can you detect the presence of a river in the distance?

What has been the cause of the recent growth in manufactures?

How did this territory profit by the finding of gold in California?

Is the larger proportion of the population made up of city-dwellers or of country-dwellers?

What is the most disagreeable feature of the climate of this state? What are several of its pleasant features?

How has the location of the state affected its railway mileage?

Describe the part taken by Kansas in the slavery struggle. What two legislative measures had a bearing on this question?

Why has the educational problem been a difficult one? What indicates the success that has attended its solution?

What is the leading industry? How is the state divided into production zones or belts?

When did the present constitution of the state go into effect?

What was the Lecompton Constitution? Why was it never made the real constitution of the state?

What recognition does the educational system take of the needs and wishes of the rural population of the state?

How does it happen that the western region is not so thickly settled as it once was? Is the area which is too dry for crop raising mere waste land?

How many times as many representatives as senators may the state have? How often does the legislature meet?

How did Kansas rank among the states as to the proportionate number of soldiers furnished to the Union army? Why was it ever called "Bleeding Kansas?"

What church has the largest membership?

How large a proportion of the state is actually under cultivation? How large is the average farm?

What laws that have been placed on the statute books show the progressive character of the state?

Give two popular names for this state and explain at least one of them. How did the state receive its official name?

How much higher is the western boundary line than the eastern? Is the loftiest point in Kansas higher or lower than that of Illinois? Wisconsin? Maine?

instead of continuing westward, but in 1854 the population was estimated at only seven hundred.

Territorial Days. Until 1821, Kansas was a part of Missouri; but from that date until 1854 it was an unorganized territory, peopled chiefly by Indians. Beginning in 1852, appeals were made to Congress to organize the territory of Kansas, but not until 1854 were the appeals effective. The Kansas-Nebraska Bill, which created a territory of Kansas far larger than the present state, and including much of Colorado, repealed the Missouri Compromise of thirty-four years before and left the decision of the slavery question to the people of the territory. Immediately there began a fierce and bitter struggle. Immigrants from the South and from the North flocked to the territory, "squatters" from Missouri playing a particularly large part, and because of these latter, the first elections, in 1855, made the slavery party victorious. The anti-slavery men contested the election on the ground that more than twice as many votes had been cast as there were voters in the territory; they called a convention in October, 1855, and adopted a constitution prohibiting slavery. This constitution was accepted by the people, the proslavery men refusing to vote, and an election held under it in 1856 resulted in the choice of a free-state governor.

The matter was not to be settled thus quietly, however. Both sides had armed themselves; both sides were only waiting for an opportunity to break out in open violence; and the opportunity was not long in coming. After several preliminary outbreaks there occurred in May, 1856, the ill-advised raid of John Brown and his sons on Pottawatomie Creek, and for months the state was given over to the horrors of a border war. Finally, late in 1856, Federal troops were invited to the rescue by Governor Geary, and the period of lawlessness and crime was brought to an end. Federal troops prevented the assembling of the free-state legislature, and a constitution adopted at Lecompton by the proslavery party was submitted to the people early in 1858. It was rejected, and the proslavery party began to see that its chances for dominance were lessening, so steadily was the number of Northern immigrants increasing. At last a constitution prohibiting slavery was adopted, and on January 29, 1861, Kansas was admitted to the Union as the thirty-fourth state, entering just prior to the War of Secession.

Statehood. The new state was very loyal, sending to the Union armies a larger number of soldiers in proportion to its population than any other state. A sort of guerilla warfare was kept up by the Confederates in the eastern part, and added to the horrors caused by the drought and famine of 1860. "Bleeding Kansas," they called it then, but immediately after the close of the war a period of rapid development set in. There was a steady stream of immigration, and railroads began to do their part in expansion, the first train having entered the state in 1860 over the Union Pacific. There were occasional Indian troubles, but after 1868 most of the tribes were moved to Indian Territory, now a part of Oklahoma.

The later events in the history of the state have been concerned chiefly with legislative questions, over many of which there have been sharp contests. The prohibition question came up first, to be settled after a long controversy in favor of the temperance forces. This was succeeded by strong anti-trust agitation, and by a long-continued campaign for woman suffrage, both resulting in legislative enactment or constitutional amendments (see subhead *Government* above. For the most part the state has been, throughout its history, Republican in politics, but in the Presidential election of 1912 the Democratic party received a considerable plurality, the Progressives also polling a large vote. In 1916 the state cast its vote for Woodrow Wilson for President, but elected a Republican governor. A.MC C.

Consult Hazelrigg's *New History of Kansas* (designed expressly for use in schools); Green's *Early Days in Kansas;* Dobbs' *Kansas Voters Manual.*

Related Subjects. The following articles in these volumes will be of interest in connection with the study of Kansas:

CITIES

Atchison	Kansas City
Chanute	Lawrence
Coffeyville	Leavenworth
Emporia	Parsons
Fort Scott	Pittsburg
Hutchinson	Salina
Independence	Topeka
Iola	Wichita

HISTORY

Brown, John	Lecompton Constitution
Coronado, Francisco Vasquez	Louisiana Purchase
Kansas-Nebraska Bill	Missouri Compromise

PRODUCTS AND INDUSTRIES

Apple	Corn
Cattle	Dairying
Coal	Flour

ıd Meat
ing
Salt
Wheat
Zinc

RIVERS

as
Missouri

SAS, UNIVERSITY OF, a coeducational ion supported by appropriations from ate, income from land endowments, t fees and private gifts. It was founded legislature of Kansas at Lawrence in nd began work in 1866. Since the year ıe student enrolment has increased from 2,959 in 1915-1916. The university con- f the graduate school, college of liberal ıd sciences, school of engineering, school arts, school of law, school of pharmacy, r session, school of medicine, school of ion, division of university extension and n of state work. In connection with the it carries on a large amount of public work for the state, giving to the public s commission and the state board of the time and service of several instruc- ıd investigators. The university has an income for general maintenance of 0, and for permanent repairs and im- ıents of $25,000. The libraries contain volumes and about 44,000 pamphlets. culty numbered 220 in 1916.

SAS CITY, KAN., the largest city in ate in population, one of the largest ɔck markets in the United States and unty seat of Wyandotte County. It is d on the Kansas (or Kaw) River at ıint where it meets the waters of the ıri River. Chicago is 483 miles north- nd Saint Louis, Mo., is 283 miles south- ıy rail. Transportation is provided by ɔn, Topeka & Santa Fe, the Chicago, sland & Pacific, the Chicago Great West- e Union Pacific and the Missouri Pacific. reight and passenger service is afforded ɔ interurban lines. The population in- l from 82,331 in 1910 to 99,437 (Federal te) in 1916. The area of the city exceeds square miles. The city occupies both of the Kansas River, and on the east ı Kansas City, Mo., the dividing line he state boundary line. Across the river ɜ point are fourteen bridges. Indus- and commercially they are as one city, the same freight and passenger termi- elephone system and street-car service; ınicipal government of each, however, is ndent.

Kansas City is on the 39th parallel of latitude; Lake of the Woods, which is on the boundary between the United States and Canada, is just ten degrees north, on the 49th parallel; and Galveston, on the Gulf of Mexico, is about ten degrees south. The city is thus very nearly in the center of the country, reckoning from north to south. The exact geographic center of the United States, however, falls a little to the west and north. (See map of Kansas, in full-page illustration, page 3207.)

Boulevards and Institutions. The city is showing rapid development in its public improvements, boulevards, etc. The park reservation covers 250 acres, including City Park, a beautiful natural reserve of 100 acres, and nineteen smaller parks and playgrounds. Adjoining the Wyandotte Indian Cemetery, in the heart of the city, is Huron Park, in the center of which is the Carnegie Library. For advanced education there exists Kansas City University (Methodist Episcopal), Western University, for colored students, and a college of medicine and surgery. There are two hospitals, Bethany and Saint Margaret's, and the city contains the state institution for the blind. The city is one of the largest in the Union having no saloons, for statewide prohibition is operative in Kansas.

Industry. After Chicago, Kansas City and its companion city constitute the most important live-stock market in the United States. The immense slaughter houses, stock yards and meat-packing plants, for which the city is noted, are located close to the boundary which nominally separates the twin-cities. It has also large grain interests, the elevators on the Kansas side having a capacity of nearly 9,000,000 bushels. Industry is further represented by railroad and machine shops, flour mills, iron and steel works, smelters, soap, fertilizer, box and barrel factories, and wholesale grocery houses.

History. The settlement was known as Wyandotte when it was settled by Indians of that name in 1843. White people followed, and in 1858 it was incorporated as a town; in 1859 it became a city. Here in July, 1859, the Kansas constitution was drawn up, and the city was the scene of considerable agitation at the time (see KANSAS, subhead *History*). The present charter was granted in 1886, when Armourdale, Armstrong and Wyandotte were consolidated under the name of Kansas City. The commission form of government was adopted in 1909.

KANSAS CITY, Mo., the second city of the state in population, ranking next to Saint Louis, and one of the most rapidly-growing cities of the Union, noted primarily for its prominence in the grain and live-stock markets. It is situated on the western border of the state, in Jackson County, of which it is the county seat, at the point where the Missouri River is joined by the Kansas (or Kaw) River and ceases to be the western boundary of the state, turning its course eastward. Adjoining the city on the west, and separated from it by the Missouri, is Kansas City, Kan. Saint Louis is 280 miles southeast and Chicago is 483 miles northeast, by rail. Through the service of the following thirteen railway trunk lines the city has become one of the largest distributing points in the United states: the Atchison, Topeka & Santa Fe; Chicago, Burlington & Quincy; Chicago & Alton; Chicago Great Western; Chicago, Milwaukee & Saint Paul; Chicago, Rock Island & Pacific; Kansas City Southern; Missouri Pacific; Missouri, Kansas & Texas; Quincy, Omaha & Kansas City; Saint Louis & San Francisco; Union Pacific, and Wabash.

The Kansas City, Mexico & Orient and the Missouri, Oklahoma & Gulf railways are in course of construction to this point. Eight interurban lines are in operation to the city. To facilitate railroad transit, four fine bridges have been constructed across the river. Water transportation to the sea, by way of the Missouri and Mississippi rivers, is provided by the Kansas City-Missouri Navigation Company. The foreign born comprise only ten per cent of the population, which increased from 248,381 in 1910 to 297,847 (Federal estimate) in 1916. In number of inhabitants the city ranks twenty-first among the cities of the United States. It has an area of fifty-eight and one-half square miles.

Commerce and Industry. Kansas City, Mo., Kansas City, Kan., and Rosedale, Kan., together known locally as Greater Kansas City (population in 1915 exceeding 405,000), are all one family industrially and commercially, having the same freight and passenger terminals, the same street-car system and the same telephone service. The strongest bond, however, between Kansas City, Mo., and the sister city in Kansas, is formed by their grain, live-stock and meat-packing interests. The live-stock industry of the two cities combined is second only to that of Chicago. Among the cities of the Union, Kansas City ranks first as a winter-wheat market and third as a primary grain market. It has an elevator capacity of more than 18,000,000 bushels and the enormous capital necessary for handling its grain business, and it controls an extensive wholesale and jobbing trade as the distributing point of a rich agricultural territory to the west and southwest.

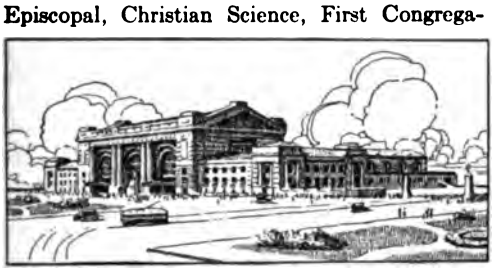
It is also a foremost hay, mule and lumber market, and does an extensive business in coal, lime, cement and flour, milling being one of its rapidly-growing industries. An important factor in the prosperity of the city in recent years is its location near the great oil fields in Oklahoma, and its nearness to raw material and vast deposits of coal and its excellent facilities for transportation have greatly stimulated manufacturing.

Parks and Boulevards. Since the early days of the city, when settlers began to build homes on the rugged bluffs towering above the river, so much has been done to improve natural surface conditions that Kansas City is now classed with the most beautiful cities of the Union. It is built on three terraces, the wholesale and manufacturing districts occupying the lowest part, and the business section the elevation above, the two being connected by viaducts and tunnels. The upper part of the city is reserved for the residential district, and here, where hilly surface permits magnificent landscape treatment, possibly the greatest improvement in the city is noticed. The park and boulevard system of Kansas City, comprising

over 2,600 acres, is famous. There are nineteen parks, well distributed throughout the city, and linked by sixty miles of continuous boulevards to form a beautiful chain.

These fine avenues are lined with stately old trees, and with magnificent homes set well back on spacious grounds. Cliff Drive is noted for its beauty, for it is cut in the hillside and winds in and out for four miles; wonderful rock formations greet the eye at every turn on the one side, and on the other is a view of the river below. Kersey Coates Drive and the Paseo are also drives of unusual charm. Swope Park (1,380 acres), the largest and the most beautiful of the parks, was given to the city in 1896 by Colonel Thomas H. Swope. There are numerous breathing spots and playgrounds in the more congested districts; even the business section has its area of green.

Buildings. Kansas City has great churches, imposing school buildings and splendid modern business buildings, but its finest structure is the new Union Station, which was erected at a cost of $6,000,000. It is one of the largest railroad terminals in the United States. Other noteworthy buildings are the Federal building, city hall, courthouse, Convention Hall (with a seating capacity of 15,000), the Board of Trade, Y. M. C. A. building, Live Stock Exchange (devoted exclusively to live-stock offices) and City Hospital. The Calvary Baptist, Trinity Episcopal, Christian Science, First Congregational, Roman Catholic Cathedral, Central Methodist Episcopal, First Baptist, Jewish Temple, Redemptorist Fathers (Roman Catholic) and Christian churches are all structures of unusual architectural beauty. Kansas City has a United States Weather Bureau Station and a Federal Reserve Bank.



THE UNION STATION

Education. In addition to over 130 public schools, the city has institutions for special training in medicine, dentistry, law, engineering, music, business and domestic science. There are parochial, private and college-preparatory schools and a public library, and within the radius of a few miles are the University of Kansas, at Kansas City, Kan.; Baker University, at Baldwin; William Jewell College, at Liberty; and Park College, at Parkville. For neglected and abandoned children, the Juvenile Court provides a girls' industrial home and a farm for boys.

History. In the beginning Kansas City was a fur-trading post, known as Westport Landing. In 1838 the town was organized under the name Kansas, originally spelled *Kanzas*. It is commonly thought that the city was named for the state of Kansas, but this is an error, as all of the territory west was then known as the Nebraska Territory; Kansas City and the state of Kansas probably received their names from the same source, the Kanzas tribe of Indians. The town was incorporated as the "Town of Kansas" in 1850; the name was changed to "City of Kansas" in 1857 and to its present name in 1889. Within five years after its settlement, the town had almost the entire trade of New Mexico, traffic being along the highway known as the "Santa Fe Trail;" a huge rock in one of the city's parks now marks the original route.

KANSAS CITY IN 1846
From an old print

The first post office in Kansas City was established in 1845, and ground for the first railroad was broken in 1860, by the Pacific Railroad, now the Missouri Pacific. The first railroad west of the Missouri River, the Kansas Pacific, was commenced at Kansas City in 1863; it is now the Union Pacific Railway. The completion of the first bridge across the Missouri River in 1869 at this point was an event of importance in the city's history. A flood in 1903 caused serious destruction. N.R.R.

KANSAS-NEBRASKA BILL, a bill introduced in the American Congress by Stephen A. Douglas in 1854, which divided and organized the territories of Kansas and Nebraska. The original bill contained as an important

provision Douglas's "sovereignty" idea (see SQUATTER SOVEREIGNTY), that "all questions pertaining to slavery in the territories and the new states to be formed therefrom, are to be left to the decision of the people residing therein, by their appropriate representatives." As this provision was directly contrary to the Missouri Compromise (which see), which prohibited slavery north of the latitude of 36° 30', Douglas introduced a second bill specifically declaring that measure "void and inoperative." The new bill became a law after a lengthy, bitter struggle. It practically admitted slavery to an area of 500,000 square miles, embracing Kansas, Nebraska, North Dakota, South Dakota, Montana, Wyoming and part of Colorado, revived the bitter contention which had been checked by the Compromise of 1850, and was an important factor in hastening the War of Secession.

KANSAS RIVER, a river of Kansas which flows through one of the finest agricultural districts of the state. It is formed by the union of the Smoky Hill and Republican rivers, in Geary County, from which it flows in an easterly direction, uniting with the Missouri River at Kansas City. Though steamers have traversed its entire course at high water, still its navigation possibilities are slight. The Solomon, Blue and Saline rivers are its chief tributaries, and the cities of Lawrence, Junction City and Topeka, the state capital, are on its banks. Including the Smoky Hill fork, which rises in the Rocky Mountains, it is about 650 miles in length.

KANT, *kahnt,* IMMANUEL (1724-1804), a German philosopher, celebrated as an original thinker, and accounted by many the only modern philosopher who ranks favorably with Plato and Aristotle. He never traveled beyond a distance of sixty miles from his native town, Königsberg, Prussia. He never engaged in any work except as scholar, tutor, university official and writer. His *Critique of Pure Reason,* which was published in 1781, is probably the most important philosophical work of the last two centuries. In 1785 and 1788 he published works bearing on his ethical doctrine, and in 1790 a philosophical essay upon esthetics and upon the presence of design in nature. His *Essay Upon the Philosophy of Religion* appeared in 1793. The aged philosopher planned a large philosophical work which was to be a fitting crown to his systematic labors, but he was unable to finish this treatise on account of his mental ineffectiveness.

KAOLIN, *ka'o lin.* On a high ridge in China which the natives call *Kaoling* is found a pure white clay, from which the Chinese make their celebrated porcelain and pottery ware. From the Chinese name of the hill the name *kaolin* has been given this clay. Kaolin is decomposed feldspar and contains silica, alumina and traces of soda-potash and lime. It is usually white when burned. It can be ground to a fine powder, and has been extensively adopted for making the highest grades of pottery and for filling the pores and making a smooth surface on paper. It is now mined in various parts of the world. The largest mines in Europe are at Cornwall, England, and it is also obtained in large quantities in France and Germany. In the United States kaolin is found in Connecticut, Delaware, Georgia, Nebraska, North Carolina, Pennsylvania and Vermont.

When taken from the mine, kaolin contains quartz rock and other impurities which are separated from it by mixing with water in large settling tanks. When the impurities fall to the bottom, the kaolin is drawn into other tanks and allowed to settle. It is then dried and cut into cakes which are sent to pottery works. See POTTERY.

KARAKORUM, *kah rah ko'rum,* **MOUNTAINS,** a range in Central Asia, lying between Kashmir and Eastern Turkestan, on a lofty table-land that is often called "the roof of the world." The Karakorum Mountains, together with the Pamir, Elburz, Suleiman and Tian Shan ranges, form the great Pamir plateau, from which also rise "the mountains of snow," or the Himalayas, which have the highest peaks in the world. The giant peak of the Karakorums, Mount Godwin-Austen, 28,278 feet in height, is, after Mount Everest, the highest known point on the globe. Minerals abound in this range, copper and lead having been mined from ancient times; gold, zinc, sulphur and salt are also obtained.

KARLSRUHE, or **CARLSRUHE,** *kahrls'roo e,* meaning *Charles's Rest,* an interesting city of Germany, surrounded by parks and gardens and noted for its well-paved streets, its fine public squares, buildings, fountains and monuments. It is situated five miles east of the Rhine River and thirty-nine miles northwest of Stuttgart, and is the capital of the grand duchy of Baden. Its name was taken from Charles William, margrave of Baden, who, because of disputes with the citizens of Durlach in 1715, erected on the site a hunting seat, around which the city has since been built. Among the important

buildings are the palace of the grand duke, from which the leading seventeen streets radiate like an expanded fan; a court theater, a court library containing 190,000 volumes, several valuable museums and a hall of fine arts. There is also a fine botanical garden and a school of forestry. Karlsruhe carries on a considerable trade through its locomotives, machinery, carpets, woolens, paper and snuff manufactories. Population, 1910, 134 310.

KAR'NAK. See THEBES.

KASHGAR, *kahsh gahr',* an important political city of East Turkestan, in Central Asia. It consists of two towns—the "old city" and the "new city"—separated by the Kashgar, a tributary of the Tarim River. The people, mainly Turks, excel in the making of carpets, silks, gold and silver cloth, cottons, saddlery, etc., and carry on their trade chiefly through Russia. The latter country maintains a permanent consul at Kashgar, the only European diplomat in that part of Asia. A Chinese official with the title of *taotai* is the chief administrative officer. Kashgar is the center of Mohammedan learning in East Turkestan. The environs of the city are noted for great fertility and for a variety of excellent fruit, due to extensive irrigation derived from several rivers and canals. Population, estimated, from 60,000 to 70,000.

KASHMIR, or **CASHMERE,** *kash meer',* noted as the place of manufacture of the famous Cashmere shawls, and called by the Asiatics "the Paradise of India," is an extensive principality in the northwest of Hindustan. It is subject to a ruler belonging to the Sikh race, but politically is surbordinate to the British Indian Empire. The area, estimated at 80,900 square miles, is composed of various provinces or districts, of which Kashmere proper is the most famous and interesting. It is a valley surrounded by the gigantic Himalayas and Hindu Kush mountains and is traversed by the River Jhelum. Ten passes lead through the mountains into this valley, varying in height from about 9,000 to 12,000 feet.

Despite the cold climate, due to the valley's elevated situation and the snow-crowned mountains which surround it, the region is very fertile and is well watered by streams. Forests on the slopes, fields of corn, rice crops along the sides of the rivers, rich orchards, and an abundant growth of flowers and fruits have rendered this district famous; indeed, the valley is noted for its roses and jasmine, and the extracted oil from these and other flowers forms an important article of export. Attention now is being given to the culture of the vine. Jamoo is the capital of the whole principality. Srinagar, the largest town and the summer residence of the native ruler, or maharajah, was founded in the sixth century, coming under British protection in 1846. Population of the principality in 1911, 3,158,126.

Cashmere Shawls, once a treasured possession in the wardrobes of womanhood the civilized world over, are made from the inner wool of the wild goat. The shawls are woven or embroidered by hand in stripes and afterward skilfully sewed together, and their patterns have remained unchanged down the ages. During the beginning of the nineteenth century the manufacture of an imitation of Cashmere shawls was begun in Europe, particularly at Paisley, Scotland, where a pure wool shawl was made which became a rival of the true Cashmere shawl and marked its decline in the world's market.

KATAHDIN, *ka tah'din,* from the Indian word *Ktaadn,* meaning *big mountain,* is a prominent peak of the Appalachian Mountains, and the highest mountain in Maine. It is well described by Thoreau in his *Maine Woods.* The peak is 130 miles northeast of Augusta, in the central part of the state, and has an altitude of 5,385 feet. The sides of the mountain are composed of granite and bear glacial scratches produced during the ice age period; and on its summit are found only mosses and lichens and a few stunted plants. It is located in the midst of a wilderness, the Penobscot River being the best means of access to the region. A panoramic view of the surrounding country is obtained from its summit.

KATRINE, *kat'rin,* better known as LOCH KATRINE, is a picturesque lake in the Lowlands of Scotland, whose beauty has been immortalized by Scott's poem, *Lady of the Lake.* Along its banks is some of the most beautiful scenery of Great Britain, delightfully varied in its combination of forest, lake, river and mountain. It is about nine miles long and two miles wide, and is one of the most frequented of the numerous lakes which occupy the deep hollows within the mountain valleys.

KATTEGAT, *kat'e gat.* See CATTEGAT.

KATYDID, *ka'ti did,* the popular name of several species of large, pale-green, long-horned locusts. The name is specifically applied to the species whose song resembles the three syllables *ka ti did.* The insect produces these notes by rubbing together the bases of its front

wings, on which are little cross-ridges which form a sort of scraper. Only the male can make these sounds, which are heard most frequently at the twilight hours, in the late summer and autumn. The day note differs from the night note. There are about twelve kinds of katydids in the United States, a well-known species being the angular-winged. Its eggs

I love to hear thine earnest voice,
Wherever thou art hid,
Thou testy little dogmatist,
Thou pretty Katydid!
Thou mindest me of gentlefolks,—
Old gentlefolks are they,—
Thou say'st an undisputed thing
In such a solemn way.
HOLMES: *To an Insect.*

The illustration shows a katydid, one leg, disclosing location of ear, and a leaf with egg cluster along its edge.

are flattened, oval and slate-brown; they are laid on the edges of leaves and on the twigs of trees, in double, overlapping rows, early in the fall and at intervals until the frost appears. In the spring the egg splits along the edge and the small katydid appears. See LOCUST; GRASSHOPPER.

KAULBACH, *kaul'bahK,* WILHELM VON (1805-1874), one of the leaders of the modern German school of art, whose fame rests on his cycle of paintings depicting the progress of civilization in typical scenes from the great historic periods. The series, which embraces six colossal compositions, decorates the walls of the vestibule of the Berlin Museum, and includes *The Tower of Babel,* the *Glorious Age of Greece,* the *Destruction of Jerusalem,* the *Battle of the Huns, Crusades* and the *Reformation.* Kaulbach was born at Arolsen, Waldeck, and first studied at the Düsseldorf Academy of Arts under Cornelius, whom he followed to Munich. From 1849 to the day of his death he was director of the Academy of Painting in that city. His last gigantic painting is the *Sea-fight of Salamis* (Munich gallery). He also made many illustrations from the works of Goethe, Schiller and Shakespeare, and painted many portraits. As the executor of many important public commissions he revealed strong power of characterization.

KAUNITZ, *kau'nitz,* WENZEL ANTON DOMINIK, Prince (1711-1794), for some years the youngest member of the Cabinet of Maria Theresa of Austria. Fitted by education and travel for diplomacy, he entered the service of Charles VI while still a young man. He was always in poor health and was continually accused of frivolity, but nevertheless he was the clearest of thinkers and one of the ablest diplomats of his day. He was a real patriot,

KAUNITZ
From a medallion.

and it was the realization of this that gave him Maria Theresa's complete trust; she invariably supported his policies. His greatest diplomatic victory was the winning of France to sign the Treaty of Versailles against Frederick the Great in May, 1756. After the death of Maria Theresa in 1780 his power in the state steadily declined; in 1792 he resigned, and two years later he died. See MARIA THERESA.

KAW, or KANSA, a tribe of North American Indians, belonging to the Siouan stock, and an offshoot of the Osage tribe. They were driven from their original home in Missouri into Kansas by the Dakotas, and drifted from one reservation to another until they settled in what is now Oklahoma, in 1873. They now number about 200. In the days of their primitive strength they were active in hunting the buffalo. See INDIANS, AMERICAN.

KAZAN, *ka zahn',* the chief intellectual center of Eastern Russia and capital of the government of the same name, is situated on the Kazanka River, about three miles from its junction with the Volga and 430 miles east of Moscow. Its university, a great seat of Oriental learning, founded in 1804, has four faculties and nearly 1,200 students; the institutions connected with it include a library of 235,000 volumes, an observatory, a botanical garden and an antiquarian museum. The town contains about fifty churches, a dozen mosques and the Syumbeka Tower, venerated by the Tartars. The central parts of the town are occupied by Russians, while the Tartars live

in the suburbs. There are prosperous woolcombing, weaving and dyeing establishments, as well as government shipbuilding yards. Leather, soap, textiles and iron and steel goods are important manufactures. The timber, flour and hemp fairs of Kazan are among the largest in the Russian empire. The town was destroyed by fire in 1774 during a rebellion, and has since frequently suffered from the same disaster. Population, 1911, 188,100.

KEAN, *keen,* the family name of two actors known in their day on the American and European stage as the greatest impersonators of Shakespearean characters. Coleridge, the English poet, said of Edmund Kean that "seeing him act was like reading Shakespeare by flashes of lightning."

Edmund Kean (1787-1833), the first of the name to achieve fame, was born in London. His childhood was spent in poor surroundings, his mother being a strolling actress named Ann Carey, and his father a stage carpenter. When he was twelve he joined a company of wandering players with his mother and for a number of years acted in small cities, assuming every variety of character from pantomime to tragedy. He was married in 1808, and for a number of years experienced such difficulty in securing recognition for talents that his family often went hungry. In 1814 he made his first appearance as Shylock in *The Merchant of Venice,* at Drury Lane Theater, London, and from that time his fame was assured. He made two tours of the United States and Canada, the first in 1820 and the second in 1825.

Charles John Kean (1811-1868), second son of Edmund Kean, was born at Waterford, Ireland, and educated at Eton. In October, 1827, he made his first appearance in the character of young Norval in *Douglas* at Drury Lane with but trifling success. He visited America in 1830 and soon became popular. Later his father played the title rôle of Othello and Charles appeared with him as Iago. He married Ellen Tree, one of the leading members of her profession, in 1842, and they acted together until his death. His management of the Princess Theater in London was celebrated for the splendid productions of *Hamlet, King John, Macbeth, The Tempest* and other Shakespearean plays. The character of Hamlet was his greatest Shakespearean interpretation.

KEARNY, *kahr'ni,* N. J., a residential suburb of Newark, situated in Hudson County, about nine miles west of New York City. It lies opposite Newark, on the Passaic River and on the Erie Railroad and electric interurban lines. The population, which was 18,659 in 1910, was 23,539 (Federal estimate) in 1916. The area is about seven square miles.

Many business people of Newark, Jersey City and New York City have suburban homes in Kearny; Arlington is an especially attractive residence section. The city has a state soldiers' home, the Sacred Heart Industrial School for Boys, a Carnegie Library and an Italian orphan asylum. The industrial plants include large manufactories of linoleum, cotton and linen thread, celluloid, dyestuffs, fertilizers, roofing material, white metal, brass novelties, lamps and buttons. Kearny was first settled in 1765 by Germans; the place was called New Barbados until 1871, when it was incorporated and named in honor of a distinguished citizen, General Philip Kearny, who had won fame in several wars.

KEATS, JOHN (1795-1821), the last of the English Romantic poets (see ROMANTICISM). In a brief literary career of three years he produced a body of verse that not only places him among the foremost of his country's poets, but gives him a true claim to the title, "the poet's poet." Tennyson, Rossetti, Swinburne and other verse writers of the Victorian Age were profoundly influenced by his poetry, which has never been surpassed in English literature for pure melody and lyric beauty. Keats was the only one of the Romantic group who lived for poetry alone; he was neither a reformer nor a moralist. Beauty and truth were to him one and the same thing, and the spirit of his best work is strikingly illustrated in the opening lines of *Endymion:*

JOHN KEATS

Dying in early manhood, he little realized the great and imperishable renown that was to be his. One of his last conscious acts was to dictate this epitaph for his tomb: "Here lies one whose name was writ in water."

A thing of beauty is a joy forever;
Its loveliness increases; it will never
Pass into nothingness; but still will keep
A bower quiet for us; and a sleep
Full of sweet dreams, and health, and quiet breathing.

This poet, whose writings reveal so marvelous an appreciation of beauty, was born in lowly surroundings and of humble parentage. His father, a London stable-keeper, sent him to a private school at Enfield for his early schooling. Both parents died while he was still a boy, and when he was fifteen he was sent by his guardians to a surgeon of Edmonton, where he served an apprenticeship of five years. Two more years he spent as a hospital assistant before his rich poetic gifts found expression. The great change in his life came through his reading of Spenser's *Faërie Qucene,* the music of which enchanted him. Abandoning his profession, he published his first volume of poems in 1817, and a year later a second volume, entitled *Endymion.*

These early ventures were savagely criticized, but no criticism could crush his spirit, and his faith in himself was more than justified when, in 1820, his last volume appeared. During these three years of writing his health had become so seriously undermined that he sought its restoration in sunny Italy. The struggle was in vain, for in February, 1821, he died of consumption at Rome, and in the Protestant cemetery of that city his grave may be seen near the resting place of Shelley.

The first two volumes of verse that Keats produced revealed his splendid promise, but his early poems have not the finish that came with the ripening of his powers. *Endymion,* the story of a young shepherd who is loved by a moon goddess, is on the whole overadorned and, therefore, inferior to the poems of his last volume, to which he gave the title *Lamia, Isabella, The Eve of Saint Agnes, and Other Poems.* The reader who delights in word painting that is akin to the sweetest music will find no lovelier verse in English literature than the last writings from the pen of Keats.

Consult Hancock's *John Keats:* Keats' *Keats Letters, Papers and Other Relics,* reproduced in facsimile, and edited by Williamson.

KEELEY, *kee'li,* LESLIE (1836-1900), an American physician who gained fame as the promoter of a cure for the alcohol, opium and morphine habits. His remedy was chloride of gold and sodium, known as the "gold cure." Dr. Keeley originally engaged in the practice of medicine in Dwight, Ill., but gave it up to devote his entire time to the cure of drunkenness. He was the son and the grandson of physicians who had studied alcoholism and its effects, and he became interested in the subject very early in life. He began his experiments in search of a cure for intemperance while he was a surgeon in the Federal army in 1862. In 1880 he established a sanitarium at Dwight, and later opened sanitariums in other cities. Although his treatment has cured many cases of inebriety, it is not always as effective as Dr. Keeley had expected it would be. See ALCOHOLIC DRINKS.

KEENE, *keen,* LAURA (about 1820-1873), an actress and theatrical manager, whose real name was MARY MOSS. She became famous in London, England, in 1851 as Pauline in *The Lady of Lyons.* The following year she moved to the United States, where she spent the remainder of her life. The most noted play under her management was *Our American Cousin,* which was brought out in 1858 with Jefferson and Sothern among the supporting actors. It was while witnessing this play at Ford's Theater in Washington in 1865, in which Miss Keene was the star, that President Lincoln was assassinated.

KEENE, N. H., a city in the extreme southwestern part of the state, noted for its woodenware manufactures. It is the county seat of Cheshire County, situated on the Ashuelot River forty-three miles southwest of Manchester, and ninety-two miles northwest of Boston by rail; the Connecticut River is fifteen miles west. Four branches of the Boston & Maine Railway serve the city, and electric lines connect with adjacent towns east, south and west. The population in 1916 was 10,633, by Federal estimate; in 1910 it was 10,068. Under the authority of Massachusetts, the first settlement was made as Upper Ashuelot. It was incorporated as Keene, in honor of Sir Benjamin Keene, English diplomatist, in 1753, and was chartered as a city in 1874.

The city lies in the heart of the Cheshire Hills, in the shadow of Mount Monadnock, which rises to a height of 3,166 feet. The surrounding natural beauty extends into the city through its 220 acres of parks. The city is actively engaged in many lines of industry, principally the manufacture of furniture, building material, tubs and pails. There are also manufactures of shoes, toys, woolens, loose-leaf ledgers, manifold books and mica products, the annual output of the combined industries amounting to nearly $3,500,000. A large number of people are employed in the repair shops of the Boston & Maine Railroad, located here. There is an extensive trade in lumber and maple sugar. Granite and mica are found in the vicinity, the former having been used in

the construction of the city's three bridges. Keene has the state normal school for girls, a business college and a library with 17,000 volumes. The high school building, erected in 1913 at a cost of $125,000, is among the notable structures; the city has also a Federal building and a Y. M. C. A. building. Spofford Lake, a noted fishing resort, and Monadnock Lake are in the vicinity.

KEEWATIN, *ke wah' tin,* a town in the Kenora district, Ontario, on the Canadian Pacific Railway, at the northern end of Lake of the Woods, three miles west of Kenora and 123 miles east of Winnipeg. Lumbering and boat-building are leading industries, but the town is known chiefly as a summer resort; the fishing and big game hunting in the district also bring many visitors, most of whom come from Winnipeg. Population, in 1911, 1,242; in summer the number is nearly doubled.

KELLER, *kel' er,* HELEN ADAMS (1880-), an American writer and lecturer, blind, deaf and dumb from babyhood, who has been able to share in the joys of a normal life through the power of her own keen intellect and the faithful ministry of her teacher and companion, Miss Anne Sullivan. A serious illness before she was two years old destroyed sight and hearing, and for years her power of speech remained dormant. When Helen was eight years of age her parents brought Miss Sullivan from the Perkins Institute for the Blind, in Boston, to their home in Alabama, and the little child was taught the deaf and dumb language by touch, and learned to read by feeling raised points which represent letters (see BLINDNESS). A special typewriter was made for her use by which she did all her writing. Later she was also taught to talk, though imperfectly; the power of correct speech was developed later, and to-day Miss Keller has the power to interest large audiences in her lectures.

HELEN A. KELLER

She attended the Wright-Humason and the Cambridge schools in Boston before entering Radcliffe College, where in 1900 she was graduated with honors, after completing the usual four-years' course. During this time Miss Sullivan was her constant companion, attending all her classes with her, and repeating by the hand language the lectures and class discussions as they were being given. Perhaps Helen Keller's greatest achievement is her happy outlook on life, for she is unfailingly optimistic.

Since graduating from college she has contributed articles to the *Century* and *McClure's Magazine,* the *Youth's Companion* and the *Ladies' Home Journal.* Her longer writings include *Story of My Life* (her autobiography), *Optimism, The World I Live In, The Song of the Stone Wall* and *Out of the Dark.* She has been a member of several commissions serving in the interest of deaf and dumb and blind schools, and has spent some time traveling and lecturing on subjects of present-day interest, such as woman's suffrage.

One of the finest tributes ever paid to Helen Keller is Madame Maeterlinck's *The Girl Who Found the Bluebird,* which she wrote after a visit to Miss Keller.

Consult her book, *The Story of My Life.*

KELLOGG, *kel' og,* CLARA LOUISE (1842-1916), an American dramatic soprano, born at Sumterville, S. C. The greater part of her musical education was received in New York, but it was completed abroad. Her first rôle to receive enthusiastic applause was that of Marguerite in *Faust;* later she was equally successful in other rôles, her dramatic powers and singing receiving high recognition. She organized an English and an Italian opera company, in both of which many famous singers won their first laurels. She was the first American singer to win European plaudits. In 1887 she married Carl Strakosch and retired from the stage. Madame Kellogg's autobiography, *Memoirs of an American Prima Donna,* attracted wide attention on its publication in 1913.

KELOWNA, *kel ow' nah,* a city in British Columbia, in the Yale district, in the southern part of the province. It is on the east shore of Okanagan Lake, sixty-four miles north of Penticton by steamer and thirty miles south of Okanagan Landing. At Okanagan Landing connection is made with a branch line of the Canadian Pacific Railway, which meets the main line at Sicamous, fifty miles farther north. The region about Kelowna is a fruit-growing district, especially famous for its apples, and the principal manufacturing plants of the city

make boxes and baskets, pack the fruit, either fresh or preserved, or make it into jams. There are large orchards and gardens within the city limits. Tobacco is raised in small quantities, but only for local demand. Kelowna has a race-track and a municipal park, with a frontage of a mile on Okanagan Lake, and owns its electric light and power plants. The general hospital and the exhibition building are conspicuous structures. Population in 1911, 1,663; in 1914, by the civic census, 3,100.

KELP, the alkaline ash obtained by burning certain seaweeds of the same name, found on the coasts of Ireland, Scotland and Brittany. It is an important source of iodine, the amount obtained varying from four to fifteen pounds to the ton. About twenty-five per cent of kelp is potassium chloride; common salt, sodium carbonate, sodium and potassium sulphates and potassium or sodium iodide are also present. Formerly the crude alkali obtained from the ash was used in soap-making, but cheaper processes are now employed. Kelp plants, partially dried, are used as a fertilizer. Extensive groves of giant kelps, an allied species, are found on the Pacific coast of America. These kelps are now being used as a source of commercial potash.

KEL'VIN, WILLIAM THOMSON, Baron (1824-1907), a British mathematician and scientist, famed for his many discoveries and inventions in physics, and for his labors as electrical engineer for the Atlantic cables of 1858 and 1866 (see CABLE, SUBMARINE). He was born in Belfast, Ireland. After his graduation from Saint Peter's College, Cambridge University, in 1845, he went to Paris and spent a year in the physical laboratory of the celebrated scientist, Henri Regnault. In 1846, when twenty-two years of age, Thomson accepted the chair of natural philosophy in the University of Glasgow, a position which he held with the greatest distinction for fifty-three years. He was the first editor of the *Cambridge and Dublin Mathematical Journal*, and in this publication appeared accounts of many of his greatest discoveries. He also contributed to other important scientific journals. He was knighted in 1866 and in 1892 was raised to the peerage, receiving the title of Baron Kelvin of Largs. British, French and German scientific organizations conferred upon him the highest honors, and the jubilee anniversary of his professorship in 1896 was celebrated by a splendid gathering of all the great scientists of his time from all the countries of Europe.

Lord Kelvin's work in connection with the laying of the Atlantic cable led to his invention of the mirror galvanometer, used in cable signaling, and he also devised the siphon recorder, which is still employed for receiving the signals. He invented many pieces of electrical apparatus and improved the mariner's compass, freeing it largely from the magnetic action of the iron of the ship. He made discoveries in every field of energy—sound, light, heat, magnetism and electricity—and conclusively proved one of the most fundamental principles of modern science, the conservation of energy. Lord Kelvin published more than three hundred original papers covering the vast field of his scientific discoveries, and with Professor Tait wrote the very important *Treatise on Natural Philosophy*.

KEMBLE, *kem'b'l*, FRANCES ANNE (1809-1893), an actress and author, better known as FANNY KEMBLE. She made her first appearance on the stage in 1829 at Covent Garden, London, as Juliet, and later was successful as Portia and Lady Teazle. Had it not been for the financial troubles of her father she would probably have been celebrated only as a clever writer, for she looked upon the theater simply as a means for earning money. After a successful trip to America with her father she returned to London in 1847, and from that time made her home alternately in America, England and on the Continent. Her *Record of a Girlhood* chronicles her earlier successes. At eighteen she wrote a clever but immature drama which showed intellectual vigor. Later she wrote a tragedy, *Francis the First*, and a book of poems.

KEMP, ALBERT EDWARD (1858-), a Canadian manufacturer and statesman, who became a member of the Borden Ministry upon its organization in 1911. He was born at Clarenceville, Quebec, was given a thorough academic schooling, and became a successful business man. He first appeared in politics in 1900, when he was elected as a Conservative to the House of Commons. He held his seat until 1908, when he was defeated for reëlection, but in 1911 was again elected, and was appointed a Minister without portfolio in the Borden Cabinet. In May, 1915, he was appointed chairman of the War Purchasing Commission, which handled, in the first year of its organization, contracts for all supplies, except munitions, amounting to more than $100,000,000.

In 1915 and 1916 Kemp was several times acting Minister of Militia and Defense during

the absences of Sir Sam Hughes, and in November, 1916, after the resignation of Hughes, Kemp was appointed to succeed him.

KEN'DALL, AMOS (1789-1869), an American statesman and political leader who served as Postmaster-General during the administrations of Presidents Jackson and Van Buren. He was born at Dunstable, Mass., and for several years acted in the capacity of tutor in the family of Henry Clay, in Kentucky. Later he was admitted to the bar. After Jackson's election to the Presidency he became a leading figure in the famous "Kitchen Cabinet" (see KITCHEN CABINET), and was influential in shaping the policies of the administration. President Jackson made him an auditor in the Treasury Department and later Postmaster-General, and in the latter office he was continued by President Van Buren. Of several improvements in the postal service, due to his initiative and good judgment, the money-order system is most important. Kendall edited several newspapers. During his last years he devoted himself to many philanthropic enterprises, for he had amassed a great fortune through his investments with Samuel F. B. Morse in telegraph patents. He wrote a *Life of Jackson* and an *Autobiography.*

KENESAW MOUNTAIN, BATTLE OF, a battle of the War of Secession, fought in Cobb County, Georgia, June 27, 1864, during Sherman's march to the sea. The Federal army of about 95,000, under General Sherman, was marching from Chattanooga to Atlanta, and General Joseph E. Johnston's army of 60,000 Confederates was retreating before them. Johnston, who was extremely prudent, finally intrenched his army at Kenesaw Mountain, where it was attacked by the Union army under the lead of McCook and Logan, the former being killed. The Federals, who were repulsed, suffered a loss of about 3,000; that of the Confederates was 700. After this battle only two engagements were fought before Sherman forced the surrender of Atlanta.

KEN'ILWORTH, a town of England, in Warwickshire, four miles north of Warwick, whose chief attraction is its magnificent ivy-covered ruin, the famous Kenilworth Castle. This historic building, founded in the reign of Henry I, formed the setting for many notable events in English history, as well as the background for Sir Walter Scott's novel, *Kenilworth.*

Scott founded his romance on Mickle's ballad of *Cumnor Hall,* which tells the tragic story of Amy Robsart, the martyred wife of Queen Elizabeth's favorite, the Earl of Leicester. Queen Elizabeth, Sir Walter Raleigh, Shakespeare and other historical personages are introduced, and elaborate descriptions are given of the queen's visit to the castle and the gorgeous entertainment given there for her by

RUINS OF KENILWORTH CASTLE

the Earl of Leicester, to whom the castle was presented. The festivities continued for nineteen days, during which every sort of wasteful extravagance possible at that age was indulged in. The town has now a population of about 5,000.

KENNAN, *ken'an,* GEORGE (1845-), an American author and lecturer, celebrated for his investigations of the Siberian exile system. He was born in Norwalk, Ohio, was educated at Williams College, studied telegraphy, and became manager of a telegraph office in Cincinnati. From 1865 to 1871 he was construction engineer of the Russo-American Telegraph Company in Siberia, during which time he was greatly stirred by what he heard regarding the exile system. Subsequently he investigated conditions of the convict system of Siberia, making a journey of over 15,000 miles, visiting mines and prisons. He then returned to America and lectured on his Siberian experiences, which led to his expulsion from Russia in 1901 when he again visited that country. Kennan served as war correspondent during the Spanish-American War in 1898 and the Russo-Japanese War in 1904 and 1905, and embodied his experiences and conclusions in lectures and in articles for various magazines. His published works include *Siberia and the Exile System, Campaigning in Cuba* and *The Tragedy of Pelee,* the latter a work dealing with the eruption of Mount Pelee, in Martinique (which see).

KENNEBEC, *ken'e bek*, one of the principal rivers of Maine, rising in Moosehead Lake and flowing south into the Atlantic Ocean. Because of its fall of over one thousand feet from source to mouth, this river furnishes excellent water power to the cities situated on its banks, among which are Augusta, the capital of the state, Waterville, Hallowell and Bath. The Kennebec is between 150 and 160 miles in length, and is navigable for large ships for about twelve miles above its mouth.

KENORA, *ken o'rah*, formerly called Rat Portage, a town in Western Ontario, the commercial, industrial and governmental center of the Kenora district. Kenora is at the northern end of Lake of the Woods, at its outlet into the Winnipeg River. It is on the main line of the Canadian Pacific Railway, 293 miles northwest of Fort William and 126 miles east of Winnipeg, and is also served by steamers which travel on Lake of the Woods and Rainy River as far as Fort Frances. Kenora is one of the most important lumbering centers in Ontario, and has a number of large lumber mills. Flour-milling is the only other large industry. Kenora is a popular summer resort, and the excellent fishing and hunting near by make it a center for tourists and sportsmen. The Roman Catholic and Anglican cathedrals, the courthouse, hospital and fire-hall are noteworthy buildings. The county court sits at Kenora, and the telephone, light and water systems are owned by the town. Population in 1911, 6,158; in 1916, estimated, 7,000.

KENOSHA, *ke no'sha*, Wis., the county seat of Kenosha County, is a manufacturing city on the southwest shore of Lake Michigan. It is in the extreme southeastern part of the state, eight miles from the state line, thirty-four miles south of Milwaukee and fifty-two miles north of Chicago. The Chicago & North Western Railroad, two interurban electric lines, Sheridan Road (an automobile highway) and freight and passenger steamboat lines connect the city with Chicago and Milwaukee and neighboring towns and ports. The population, which in 1910 was 21,371, increased to 31,576 (Federal estimate) in 1916 and includes a representation of Germans, Scandinavians and Slavs. The area is nearly three square miles.

The city is attractively situated on high bluffs overlooking a splendid harbor. The climate is [illegible] fine and the place is a favorite local summer resort. Prominent features of the city are the Federal building erected in 1914 at a cost of $75,000, the Gilbert M. Simmons public library, containing 30,000 volumes in 1916, and Kemper Hall, a Protestant Episcopal school for girls. A continuation school, a part of the public school system, is conducted for apprentices in shops.

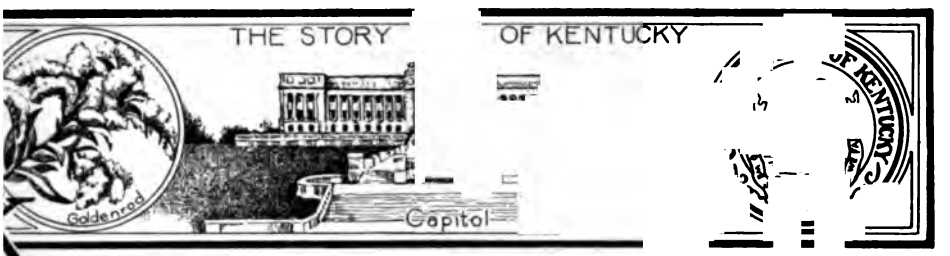
About 12,000 people are employed in the local factories, whose annual output is valued at $32,000,000. The principal products are automobiles, automobile lamps, brass, steel and iron beds, hosiery, underwear, typewriters, leather and furniture.

A settlement at this place in 1832 was first called Southport, and under that name was organized in 1842. It was chartered in 1850 as the city of Kenosha.

KENSINGTON GARDENS, a fashionable recreation park in London, in the borough of Kensington. The gardens were laid out in the time of Queen Anne, but at that early date contained only about twenty-five acres and were really no more than the grounds attached to Kensington Palace (see below). From time to time they have been added to, and at present they have an area of almost 300 acres. Many of the trees that shade the walks are of great age, and these constitute the chief beauty of the Gardens.

Kensington Palace, a royal mansion in Kensington Gardens, famous chiefly as the birthplace of Queen Victoria and as her residence at the time she was roused from her sleep to learn that she was queen of England. It belonged originally to the Earl of Nottingham, but was bought from him by William III, who added to it and made extensive alterations. Sir Christopher Wren planning and superintending these. William, his wife Mary, Anne and George II died in Kensington Palace.

KENT, James (1763-1847), an American jurist, whose famous *Commentaries on American Law*, published between 1826 and 1830, has had a permanent influence upon American legal practice and legislative principles. Kent was born at Fredericksburg, N. Y. After his graduation from Yale College, in 1781, he studied law, and was admitted to the bar in 1787. In 1793 he became professor of law at Columbia College, and later rose from justice of the supreme court of New York to be chancellor of the state. In 1823 he retired from the bench, but continued his private practice for many years. It is by his monumental *Commentaries*, however, that he will be longest remembered, as this work has not yet been superseded by any American exposition of legal principles.



ENTUCKY, one of the south-central
of the American Union, named from a
okee Indian word, which means *prairie*
barrens. It was the first district beyond
lleghany Mountains to be settled and the
d state admitted to the Union after the
al thirteen, the first being Vermont. It
pularly known as the BLUE GRASS STATE.
names have ever been more justified, for
ho travels through the extensive area cov-
by this native grass will always associate
ucky with blue grass. Besides, all the
icts which have made Kentucky famous—
eed of horses, its tobacco, its whisky—are
ified with the region where the nutritious
grass grows. The state flower is the gold-
l.

e and Location. In size, Kentucky, with
ea of 40,598 square miles, of which 417
e miles are water, ranks as thirty-sixth
g the states of the Union. The state
st to it in area is Ohio, which is 442
e miles larger. Kentucky is very irregu-
shape. Its northern boundary is formed
e winding course of the Ohio River. Its
est breadth, between the celebrated Cum-
nd Gap and Covington, on the Ohio, is
miles; while the distance between the
ern border and Paducah is only forty
. Its greatest length from east to west
out 500 miles.

People. In population, Kentucky, with
,905 inhabitants in 1910, ranks fourteenth
g the states of the Union, coming be-
Wisconsin and Iowa. The estimated
lation, January 1, 1917, was 2,386,866. It
in 1910 an average of fifty-seven persons
e square mile, and ranked twelfth among
states as regards density of population.
Canadian province of Ontario has about
same population as Kentucky, but since
the latter has had an area nine times as
. From 1900 to 1910 the population in-
ed only by 62,731 people, or about 6.6
cent; this constitutes its lowest increase
ny decade since 1820. Of the total popu-
lation in 1910, 2,027,941 were whites, and 261,-
656, or 11.4 per cent, were negroes. Kentucky,
like most of the Southern states, has a small
foreign-born population, amounting only to 1.7
per cent of the total. Only about one-quarter
of the people live in towns and cities with a
population of 2,500 or over.

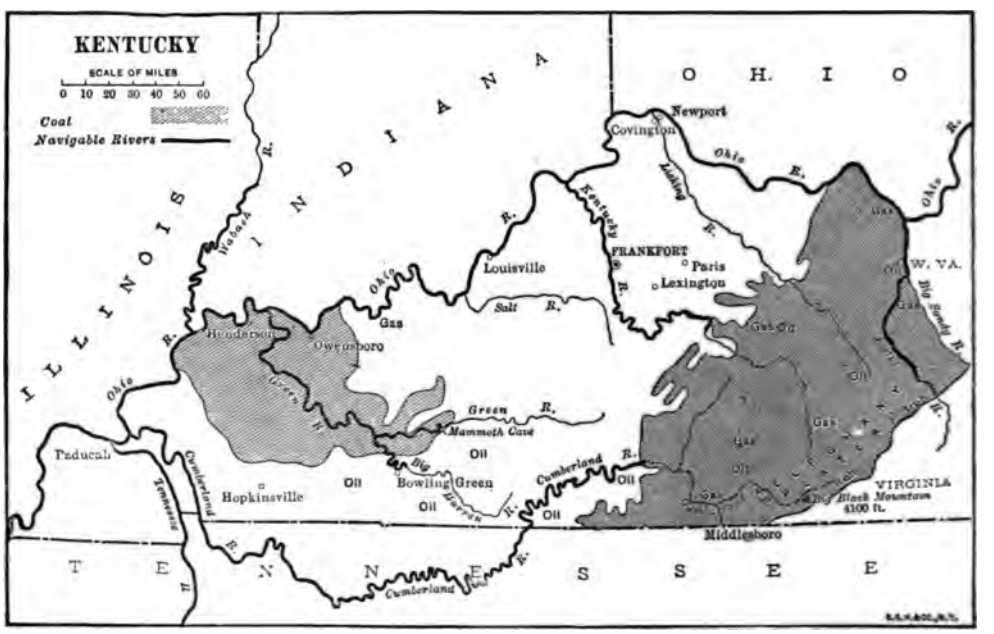
The chief cities are Frankfort, the capital;
Louisville, the largest city in the state; Cov-
ington, Lexington, Newport, Paducah, Owens-
boro, Henderson, Hopkinsville, Bowling Green,
Ashland, Middlesboro, Winchester, Dayton,
Bellevue, Maysville, Mayfield, Paris, Danville
and Richmond.

Religion. The Baptists are the strongest re-
ligious denomination, numbering about thirty-
five per cent of the total population. The
Methodists, Roman Catholics and Disciples of
Christ have about the same number of adher-
ents, each including about twenty per cent of
the population. The greater part of the re-
mainder of the state's church members belong
to the Presbyterian Church.

Education. The educational conditions in
Kentucky have long been unsatisfactory, on
account of its large, scattered rural popula-
tion, but of recent years measures have been
introduced that have produced a noticeable
improvement. A strict compulsory education
law was voted in 1912, and the office of rural
supervisor of schools was created at the same
time. There is also an official known as "the
school improvement league organizer," work-
ing in the same direction. The educational
institutions are under the supervision of a state
school superintendent, elected for four years,
and each county has its own superintendent.
There are separate schools for white and negro
children. An important feature of the school
system has developed in the numerous corn
clubs among boys, to encourage scientific cul-
tivation of corn, and the tomato clubs among
girls, for teaching domestic science (see BOYS'
AND GIRLS' CLUBS).

At the head of the higher educational insti-
tutions is the state university at Lexington;

other important schools are the Central University of Kentucky at Danville, Wesleyan University at Winchester, Berea College at Berea, Ogden College at Bowling Green, the University of Louisville, founded and maintained by the city of Louisville, and Transylvania University at Lexington. Among the schools for negroes are Bowling Green Academy at Bowling Green, Danville Polytechnic Seminary at Danville, Free Memorial Institute at Camp Nelson, and Wayman Institute at Harrodsburg. The state maintains two normal schools for training white teachers, one at Richmond and the other at Bowling Green; and there is a normal school for negro teachers at Frankfort. In 1910 there were 208,084 persons who could not read and write, forming nearly 12.1 per cent of all the people, as compared with 16.5 per cent in 1900. The percentage of illiterates was 27.6 per cent among negroes, 8.3 per cent among the foreign-born whites, and 12.2 per cent among native whites. Of late years an active movement to reduce the number of illiterates has been started, the chief means employed being the opening of the public schools at night. See SCHOOLS, subtitle *Moonlight Schools*.



OUTLINE MAP OF KENTUCKY

Showing the boundaries of the state, location of principal cities and rivers, gas and oil fields, deposits of coal, and the highest point of land in the state.

Physical Features. The surface of the state as a whole is mainly a plateau, having an average height of about 800 feet above sea level and sloping gently towards the north and west to the Ohio and Mississippi rivers. This plateau is divided, however, into a number of distinctly marked physical regions. The southeastern portion is mountainous and belongs to the Appalachian Mountain system, known here as the Alleghany Mountains. Here are found the Cumberland Mountains, which extend along most of the southeastern boundary, and contain the highest point in the state, Big Black Mountain, with an altitude of 4,100 feet. West of the Cumberland Mountains and nearly parallel with them is the shorter range of the White Mountains. Between these two ranges lies the Cumberland Valley, which has a length of seventy-five miles and a breadth of about fifteen miles, situated at an elevation from 1,000 to 1,500 feet and buttressed by peaks sometimes 3,500 feet high. The combination of mountain and valley in this region forms some of the most beautiful scenery in the Appalachian system.

The greater part of the north and central part of the state is rolling and undulating, the surface being dive d by hills and valleys. Here is situated famous "blue grass region," also called t] ton Plain; it covers an area of abo square miles and is

noted for its great fertility. The blue grass is native to this soil, and grows all the year round. It spreads like a green, thick, soft mat over the country and gives it the appearance of a beautiful park. About the middle of June it blooms, and on account of the hue of its seed-pods the landscape assumes a bluish tinge.

The southern part of Kentucky is a continuation of the highland rim of Tennessee. Some parts of it are rolling and hilly; others, like the "barrens" between the Green and Cumberland rivers, are level. Prominent features of this portion are numerous circular depressions, or "sink-holes," on the surface and the numerous caverns beneath the surface. Kentucky is noted for these caverns; one of them, the *Mammoth Cave,* is the largest cave in the world. The whole of this region is underlaid by thick formations of limestone.

Its Rivers. Most of the rivers in the state rise in the mountains or on the Alleghany plateau, and flow in a general northwestern direction into the Ohio. This river flows along the entire northern border of the state in a winding course of nearly 600 miles, and forms an important navigable waterway. The principal streams, from west to east, are the Tennessee, the Cumberland, the Green, the Kentucky, the Licking and the Big Sandy. Most of these are navigable for long distances. The Cumberland flows through the eastern and south-central part of the state, then turns south into Tennessee, but farther west enters Kentucky again and joins the Ohio a few miles east of the mouth of the Tennessee. Some of these rivers have worn deep channels through the hills and low mountains. The drainage of the cave region is mostly through underground channels. On the Cumberland and Tennessee forts Henry and Donelson, of War of Secession fame, were located.

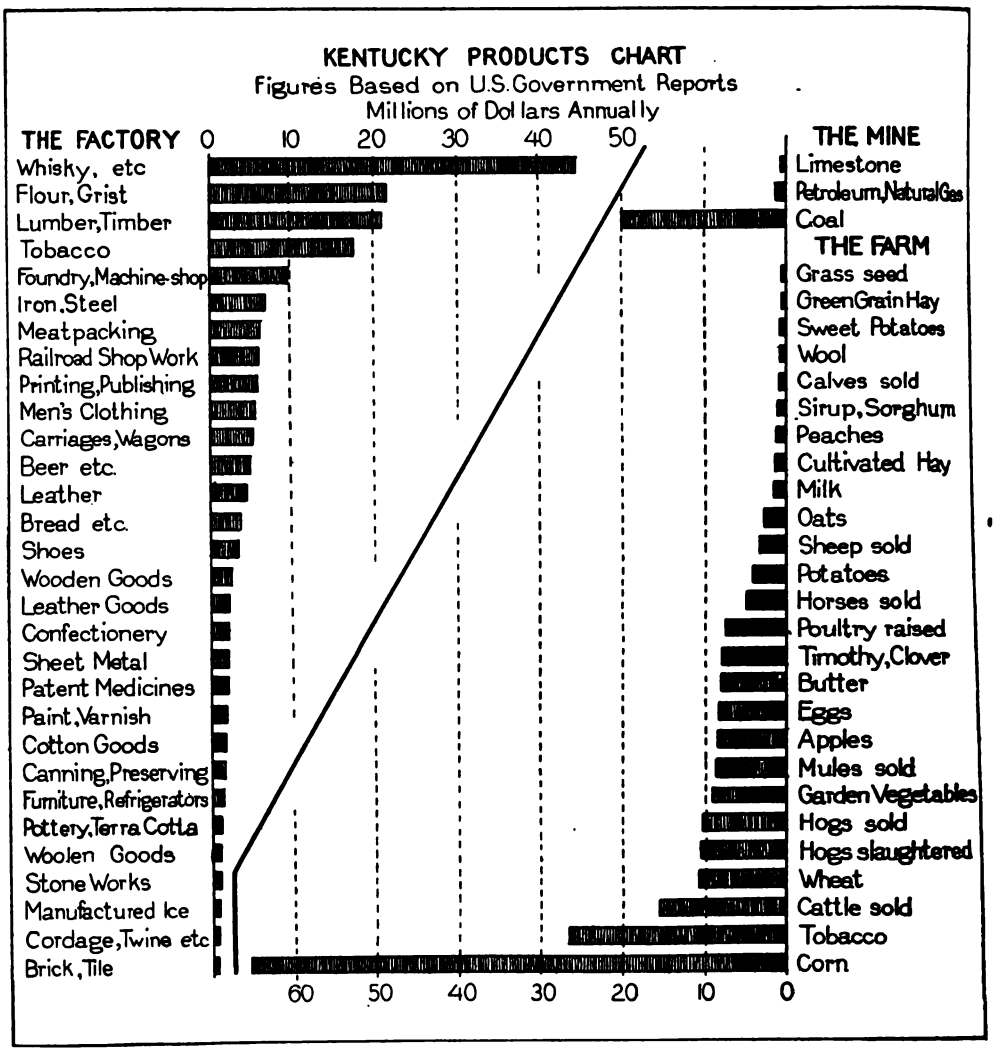
Climate. Kentucky has a warm-temperate, equable and healthful climate, which is more agreeable here than in the more open prairie states situated in the same latitude. This is due to the rolling and hilly surface of the state, which protects it from winds. The mean annual temperature varies from 55° F. in the east to 60° F. in the west. The winters are warm, having an average of 35° F., and except in the mountainous eastern regions there is but little snow. The average rainfall is about forty inches a year in the northern counties and fifty-three in the mountainous region.

Forests. This region was in former times almost completely covered with forests, and even now a third of the surface of the state is wooded. A great quantity of fine timber, most of it hardwood, is cut every year. The chief trees are oak of various species, maple, beech, ash, elm, walnut, cypress, sweet gum, birch, cedar, white pine, spruce and yellow pine.

Agriculture. Though Kentucky is not one of the leading agricultural states in the value of its products, only four states (Iowa, Ohio, Indiana and Illinois) have a larger proportion of their land under cultivation. Over eighty-six per cent of its land area of 25,750,000 acres is in farms, and two-thirds of this is improved land. About sixty per cent of the farms are operated by owners or their managers.

Tobacco. The great special crop in this state is tobacco. In its production Kentucky not only leads all the states of the Union, but its crop, which averages about 350,000,000 pounds a year, represents over thirty per cent of the entire production in the United States. Kentucky produces nearly twice as much tobacco as North Carolina, its nearest competitor, and nearly two and a half times as much as Virginia, the next important tobacco-producing state. The preëminence of Kentucky in this respect is due not only to the nature of its soil, which is specially adapted to the cultivation of tobacco, but also to its sunny, equable climate, free from extremes of heat and cold, the presence of which are fatal to the growth of such a delicate plant. The area planted to tobacco is about 400,000 acres, and this is nearly all in the western part of the state. One of the principal tobacco-growing regions is the "black patch," in the southwest corner of the state, bordering on the Tennessee "black patch." This produces a black, heavy leaf, which is sold almost entirely for export. Another is situated in the blue-grass region, and its product, the red and white Burley, is a light leaf, used largely for manufacturing smoking and chewing tobacco. The yearly value of the tobacco is nearly $30,000,000.

Other Crops. The largest crop, as regards both acreage and value, is corn. This has long formed the staple, not only for human food, but also for live stock, and is the chief material for the large distilleries and breweries of the state. About 4,000,000 acres are planted to corn, and the yield is about 100,000,000 bushels a year, valued at over $60,000,000. Wheat is another crop of importance; it covers nearly 1,000,000 acres, and the annual yield is about 10,000,000 bushels. Hay and forage



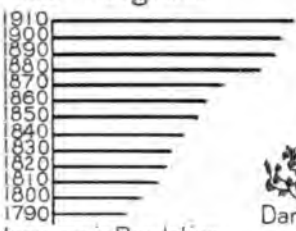
from grasses grown on the pasture lands of the state sometimes yield over 11,000,000 tons, valued at from $10,000,000 to $15,000,000.

Oats, potatoes, sweet potatoes and other market vegetables are raised in large quantities. Sorghum cane is an important crop, in which Kentucky shares leadership among states with Tennessee and Missouri. Orchard fruits, especially apples and peaches, are extensively grown; strawberries, blackberries and raspberries are less important. Kentucky is the principal hemp-growing state of the Union, its crop being ninety per cent of the total production of the country.

Stock Raising. The superb pasture afforded by the blue-grass region; the mild climate, in which cattle can remain in the field nearly all winter; the large production of corn, and the streams of pure, clear water have all contributed to make Kentucky an important stock-raising state. Kentucky is famous for thoroughbred horses. Many of the most famous horses on the American turf have been Kentucky-bred; probably the greatest horse-breeding district in the world is contained in a few counties in the blue-grass region. In value horses represent about thirty-five per cent of the state's live stock, which amounts to about $115,000,000. Cattle form thirty per cent and mules twenty per cent. Dairy products are important, and the state raises also a great number of fowls. With its 1,000,000 sheep, Kentucky is one of the important minor wool-producing states, its yearly wool clip amounting to

Lincoln Memorial Hall, near Hodgenville

"Ashland," Home of Henry Clay, Lexington



Increase in Population

Daniel Boone's Monument, Louisville

Religions

KENTUCKY

Birthplace of Abraham Lincoln

Daniel Boone's Log Cabin on Kentucky River

Echo River, Mammoth Cave

Confederate Monument, Louisville

Natural Bridge

over 3,500,000 pounds of raw wool, and 2,000,000 pounds of scoured wool.

Minerals. Kentucky has great mineral resources, which up to the present have not been fully developed. The principal product is coal, and Kentucky usually ranks fifth among the coal-producing states, being surpassed only by Pennsylvania, West Virginia, Illinois and Ohio. The annual production is about 20,000,000 ton, valued at about $20,000,000 at the mines, which is about three-fourths of the value of all the mineral products of the state. There are in Kentucky two separate areas belonging to two important coal fields. In the eastern and southeastern part of the state there is a coal area which belongs to the extensive Appalachian system, while that located in the northwest belongs to the interior field, a continuation of the coal fields of Illinois and Indiana.

The mines yield an excellent quality of bituminous coal, and about 100,000 tons of cannel coal are extracted yearly. The production of cannel coal is greater than that of any other state. Coal was mined here as early as 1827, and Kentucky was the third state in the Union to become a regular producer of coal. Beds of excellent iron ore are also found in the coal regions. Clay suitable for brick and tile and for pottery is found in abundance, and the products manufactured from clay have a value of nearly $3,000,000 a year. Petroleum and natural gas are found in several places, and building and other stones are extensively quarried. Considerable quantities of both Portland and natural-rock cement are produced. Kentucky ranks second among the states in the mining of fluorspar.

Manufactures. The state has potential resources for a large industrial development. It possesses great mineral wealth, extensive forests, large herds of cattle; it grows large crops; it has numerous waterways that afford cheap transportation. But, although its industries show a steady growth, Kentucky is not yet truly an industrial state. Its special industries are the distilling of alcoholic liquors and the manufacture of tobacco. The distilling of liquors has been conducted here for over a century, and the product, known as Bourbon whisky, after the county where it was first produced, enjoys a great reputation. The industry was established in 1794, when a large number of distillers from Pennsylvania removed to Kentucky after the Whisky Insurrection (which see). In the manufacture of distilled liquor Kentucky holds second place among the states, its product being valued at over $44,000,000, or about one-fifth of the total value of the liquor distilled in the United States. The output increased between the years 1909 and 1911, then gradually decreased, and in 1915 suddenly fell to one-third its former dimensions, due to the rapid enlargement of prohibition areas.

The manufacture of tobacco is also one of the oldest industries in the state. It dates from the eighteenth century, when tobacco was here legal tender and every town had its tobacco factories. Louisville has been for a long time one of the great leaf-tobacco markets of the world.

The lumber and timber industry is growing very rapidly. Its products are valued at over $20,000,000 a year, having trebled in value since 1890. Logging is important on the rivers in the mountain regions, and numerous planing mills have been established near the forests. The product of the flour and grist mills are valued at over $22,000,000 yearly. Meat packing and slaughtering is an important industry that is developing very fast. The manufacture of leather from the hides of the animals slaughtered is important, the bark of the numerous chestnut oaks supplying excellent material for tanning. Iron and steel mills are increasing in number, the raw material being supplied by the extensive iron ore deposits found in the state. The value of all the manufactured products exceeded $230,000,000 in 1915, showing an increase of nearly eighty per cent since 1900, but of less than three per cent in the last five years.

Transportation. The Ohio and its numerous tributaries furnish extensive waterways suitable for cheap transportation, but the state is quite inadequately supplied with railways. In fact, there are extensive areas covering thousands of square miles which are wholly without railway communication. Such is the mountainous region in the southeastern corner, and the south-central part of the state. Kentucky had 3,810 miles of railroads in 1915. The chief lines are the Illinois Central; the Louisville & Nashville; the Chesapeake & Ohio; the Cincinnati, New Orleans & Texas Pacific Railway; the Louisville, Henderson & Saint Louis; and the Southern Railway. The blue-grass region is supplied with excellent carriage roads, while fairly good roads are found elsewhere. The Dixie Highway crosses the state from Louisville to the Tennessee line.

Government. Kentucky is governed under a constitution adopted in 1891. This is the

fourth constitution the state has had since its admission to the Union in 1792. Amendments may be adopted if they receive three-fourths of the vote of each house of the legislature and are afterwards approved by a majority vote of the people. A convention to revise the constitution or draft a new one may be convened after such a proposal has been adopted by two successive legislatures and approved by a majority of the popular vote, provided that majority be at least one-fourth of the total number of votes cast at the preceding general election.

The executive officials, who are the governor, lieutenant-governor, secretary of state, treasurer, auditor, attorney-general, superintendent of public instruction, registrar of land office, commissioner of agriculture, labor and statistics, are each elected for four years. All except the governor may be reëlected. If a vacancy occurs in the office of governor in the first two years of his term, a new election is held; if during the last two years, the lieutenant-governor serves out the term. Among the offices created recently are those of state commissioner of public roads and state fire marshal.

The legislative power is vested in a general assembly, composed of a senate and a house of representatives. The senate is composed of thirty-eight members, elected for four years, half of whom are renewed every two years; the house of representatives is composed of 100 members, elected for two years. Sessions are held every second year, beginning on the first Tuesday after the first Monday in January of even-numbered years.

Kentucky sends eleven members to the United States House of Representatives.

At the head of the judicial department is a supreme court, known as the court of appeals, consisting of not fewer than five nor more than seven judges, elected for eight years. The judge longest in service is chief justice. The state is divided into judicial districts, and every county possesses a circuit court, presided over by a judge elected in the district for six years. Each district has so-called quarterly courts, the judges of which are also justices of the county courts.

For purposes of local government the state is divided into counties, and these into towns, which are divided into six classes, according to population. Towns and cities with a population of 3,000 inhabitants or over may adopt the commission form of government.

Other Constitutional Provisions. The marriage of whites and negroes is prohibited. The state adopted in 1912 a primary election law for direct nominations of all elective state, county and municipal officers. Kentucky has adopted county local option for dealing with the liquor traffic, and ninety-one counties had voted for the prohibition of the sale of liquor within their territory in 1916. Legislation for the protection of the labor of women and children has been recently enacted. The working hours for women under twenty-one, except in domestic service and in nursing, are limited to sixty a week and ten a day, and these hours were made the maximum for all women working in factories, stores, hotels, telephone and telegraph companies. The employment of children under fourteen during the school term is prohibited. A law has been passed forbidding public drinking cups.

Charitable and Penal Institutions. The state maintains a school for the blind at Louisville, one for the deaf and dumb at Danville, and one for feeble-minded children at Frankfort. The state prisons are situated at Frankfort and Eddyville; insane asylums are maintained at Lexington, Hopkinsville and Anchorage. There are several hospitals maintained by the state, and a Confederate Soldiers' Home is located at Pewee Valley.

History. Kentucky was probably first visited by Dr. Thomas Walker in 1750, but it was not settled until 1774, when James Harrod planted a colony where Harrodsburg now stands. Meanwhile, Daniel Boone had led exploring expeditions into the region, and in 1775 he established Boonesborough. In 1775 Richard Henderson induced the Cherokee Indians to give up a section of their land, comprising many thousands of square miles, and he founded a land company known as the Transylvania Company. In 1776 Kentucky was organized as a separate county of Virginia. In 1780 this was divided into three counties, and an agitation for its separation from Virginia and admission as a state to the Union was started. Virginia for a long time refused to consent to the separation, but finally passed the necessary legislation in 1790. On June 1, 1792, Kentucky was admitted as the fifteenth state of the Union.

Kentucky took a prominent part in the War of 1812, its great leader, Henry Clay, being a conspicuous member of the war party. It also was well represented in the Mexican War. In the War of Secession Kentucky at first attempted to remain neutral. Both Union and

RESEARCH QUESTIONS ON KENTUCKY

(An outline suitable for Kentucky will be found with the article "State.")

Of what important crop does Kentucky produce almost twice as much as its closest competitor? How does the product of the "black-patch" differ from that of the blue-grass region?

What famous road crosses the state?

How does Kentucky compare in railway mileage with the state which it most closely resembles in size?

How many negroes out of a hundred cannot read and write? How many native whites?

What does the state do toward the education of its negro population?

How large a proportion of the land is not in farms? What per cent of the total area is improved farm land?

What industry would seem to indicate by its course within recent years the growth of prohibition sentiment?

What has been done in connection with the school system to increase the interest of boys and girls in farm pursuits?

How did this state differ in its pioneer days from Iowa in point of forest growths?

What is *cannel* coal? Why is it so called? How much is produced in Kentucky?

Who was Kentucky's greatest statesman in the period before the outbreak of the War of Secession? How did the state stand with reference to that struggle?

If the Canadian province which most closely resembles Kentucky in number of inhabitants were as thickly settled as is that state, what would its population be?

How many states have a larger population?

Why is the climate of Kentucky more pleasant than that of some of its neighboring states?

How many stars were there in the flag after Kentucky was added to the Union?

How many states border on Kentucky without any rivers intervening? How many rivers touch its boundaries? Has it any mountain boundaries?

What river leaves the state and then enters it again? How is the southern limestone region drained?

What part has Kentucky played in the great horse races of the country? What part of the state is famous for this reason?

May a white man marry a negro woman within the borders of the state?

How many hours a day may women work in factories?

How many states in the Union are larger than Kentucky? Why is this state of such a peculiarly irregular shape?

What is Kentucky's most famous natural curiosity? How was it formed? What are some of its curious features?

Of what valuable fiber plant does this state produce nine times as much as all the other states combined?

How many constitutions has the state had? When was the present one adopted?

If the governor should die during his first year in office, who would take his place? If he should die during his third year?

What does the name *Kentucky* mean? How was the popular name earned?

What substance was used as money and passed as legal tender during part of the eighteenth century?

Confederate armies invaded the state, and it was the scene of important battles, including those of Mill Spring, Richmond and Perryville. This latter, a Federal victory, saved the state for the Union. The state furnished about 40,000 to the Confederate army and double that number to the Union army. Kentucky escaped from the military regime of other Southern states, civil government having been reëstablished in October, 1865. Since the War of Secession the Democratic party has ruled the state, except in 1895 and 1907, when the governor was Republican. O.B.

Consult Shaler's *Kentucky*, in American Commonwealths Series; Eubank's *Story of Kentucky*; Johnson's *History of Kentucky and Kentuckians*.

Related Subjects. The reader who is interested in Kentucky is referred to the following articles in these volumes:

CITIES

Ashland	Lexington
Bowling Green	Louisville
Covington	Newport
Frankfort	Owensboro
Henderson	Paducah
Hopkinsville	

HISTORY

Boone, Daniel	Virginia, subhead
Cherokee	*History*
	War of Secession

LEADING PRODUCTS

Cattle	Horse
Coal	Sorghum
Corn	Tobacco
Hemp	Whisky

RIVERS

Cumberland	Mississippi
Green	Ohio
Kentucky	Tennessee

UNCLASSIFIED

Alleghany Mountains	Cumberland Mountains
Blue Grass	Mammoth Cave

KENTUCKY, UNIVERSITY OF, a coeducational institution, located at Lexington, which has been under the control of the state of Kentucky since 1878. It was founded in 1865 as a part of Kentucky University, which is now known as Transylvania College, and was reorganized in 1878 under the name of the Agricultural and Mechanical College. The institution at the present time owns buildings and equipment valued at $1,100,000, including a campus of fifty-two acres, an agricultural experiment station and farm and a library of about 30,000 volumes. The university is organized into the colleges of arts and sciences, agriculture, civil engineering, mechanical and electrical engineering, mines and metallurgy, law and a graduate school. The income is derived both from state and national appropriations. There are about one hundred instructors and professors, and the student attendance is over 1,450. E.L.G.

KENTUCKY AND VIRGINIA RESOLUTIONS, a series of bills passed by the legislatures of Kentucky and Virginia in 1798 and 1799, directed against the Alien and Sedition Laws (which see). Those adopted by Kentucky were written by Thomas Jefferson, protesting against the Federal government assuming powers which belonged rightfully to the states. The legislature passed a resolution in 1799 giving the state the right to render void any Federal law which it considered unconstitutional. The Virginia Resolutions were probably written by James Madison; they contained the same principles as those put forward by Kentucky. Copies of the resolutions were sent to the other state legislatures, only seven of which replied, and these condemned them. See STATES' RIGHTS; JEFFERSON, THOMAS.

KENTUCKY RIVER, a river which rises in several headstreams in the Cumberland Mountains, and flows northwest for 260 miles through the most beautiful section of Kentucky, emptying into the Ohio River at Carrollton. Part of its course is between limestone cliffs. The Kentucky is navigable for sixty miles, to Frankfort, owing to a system of locks and dams, and for flatboats, 100 miles farther. Frankfort, the capital of the state, is situated on the river.

KENTVILLE, the county town of King's County, Nova Scotia, the commercial center of the Cornwallis and Annapolis valleys. It is on the Cornwallis River and the Dominion Atlantic Railway, seventy-one miles by rail northwest of Halifax. About ten miles east of Kentville is the village of Grand Pré, made famous by Longfellow's *Evangeline*, and about fifty-five miles southwest is Annapolis, also of historical interest. Kentville has a Dominion experimental farm, a provincial sanitarium and a militia camp, and is the seat of a county academy. Among its manufactures are carriages, gasoline engines and milling machinery. Population in 1911, 2,304; in 1916, about 2,500.

KE'OKUK, IOWA, the county seat of Lee County, is a city in the extreme southeastern part of the state, at the junction of the Des Moines and the Mississippi rivers. Burlington is forty-three miles north, Saint Louis 145 miles south, and Des Moines 161 miles northwest. The city is served by the Chicago, Burlington

& Quincy, the Chicago, Rock Island & Pacific, the Toledo, Peoria & Western and the Wabash railroads, and by river steamboat lines. The Keokuk and Hamilton (Ill.) bridge, first built in 1873, was reconstructed in 1915 into a double-deck bridge; the lower level is used by railroad and the interurban lines, the upper level for highway traffic. The area of the city exceeds four square miles. In 1910 the population was 14,008; as reported by the state census of 1915 it was 15,239.

Across the Mississippi at this point, and below the Des Moines rapids, is a $27,000,000 power dam (see below). Keokuk contains Rand, Bluff and Kelbourne parks, a $100,000 Federal building, Y. M. C. A. building, Masonic Temple, public library, Saint Joseph and Graham hospitals and a Home for the Friendless. Here also are located the Keokuk Medical College, a dental school, a school of pharmacy and Saint Vincent's Academy. Near the city is a national cemetery.

Settlement at this place began about 1820, but progressed slowly until 1836. The town was laid out in 1837 and named in honor of Keokuk, an Indian chief. His grave and a monument to his memory are in Rand Park. The town received a city charter in 1848. The commission form of government was adopted in 1910. J.M.F.

Keokuk Dam, the largest power dam in the world, extending across the Mississippi River from Keokuk, Iowa, to Hamilton, Ill. From the fifteen turbine generators propelled by the water which passes over it, electric power is transmitted to Saint Louis, 145 miles away, and to smaller cities in Illinois, Iowa and Missouri. The turbine wheels, one of which weighs sixty-five tons, or four times as much as any ever before made, will eventually be thirty in number, and together will produce 200,000 horse power. Each generator is able to supply 9,000 kilowatts of electricity, enough to light 225,000 lamps of the ordinary household type. Most hydroelectric generators are operated at a speed of from 200 to 500 revolutions per minute, but those at Keokuk are so large that they turn fewer than sixty times a minute. The amount of water which reaches the turbine is controlled by a governor so sensitive that the speed is changed even by the starting of a street car in Saint Louis.

The main part of the dam is 4,278 feet long. It is set in the limestone bed of the river, and is of concrete without reënforcement. In each of the 119 arches through which the water flows is a steel gate which can be raised or lowered to regulate the height of water above the dam. The lock through which river shipping passes is the same width as those at Panama, but it raises boats forty feet, eight feet more than the largest Panama lock.

Before the construction of the dam the river for twelve miles above its site was navigable only for a very short season each year, except through a government canal with three locks. Now there is a deep lake, and steamboats save two hours in their passage up the Mississippi. The dam was put in operation July 31, 1913, after two and a half years of active work and an equal amount of preliminary labor. It is owned by a corporation—the Mississippi River Power Company.

KEP'LER, JOHANN (1571-1630), a German mathematician and astronomer, whose name will endure in three imperishable principles of astronomy known as *Kepler's Laws,* was born at Weil, in Württemberg, of poor parents. At four years of age he recovered from smallpox, which left him with crippled hands and impaired eyesight. He was educated at Maulbronn and the University of Tübingen, and was appointed to lecture on astronomy in Gratz at the age of twenty-two. In that day astronomers were chiefly employed in the construction of almanacs that pertained to the science of the stars, and Kepler set himself about mastering the art. The great question that he desired to answer was, how were the great bodies in the solar system kept in their position? He wrote a book on this subject which brought him to the attention of Tycho Brahe, who had him appointed as his assistant in Prague. After Tycho's death, in 1601, a brilliant career was open to Kepler, as he was appointed imperial astronomer and mathematician. The laws that he discovered while in this service became the foundation of astronomy on more scientific lines. He passed the latter part of his life at Linz, as professor of mathematics.

Kepler's Laws. Kepler left to the world three astronomical laws, on which Newton's discoveries of the attraction of gravitation were founded; they became as well the basis of the whole modern planetary theory. These laws are:

(1) Every planet describes an ellipse, the sun occupying one focus. See ELLIPSE.

(2) The line joining the center of the sun with the center of a planet sweeps over equal areas in equal times.

(3) The squares of the periods of complete revolution round the sun of two planets are proportional to the cubes of their mean distances from the sun.

KEROSENE, *ker'o seen,* which succeeded whale-oil and the tallow and beeswax candle as the world's chief source of artificial light, but is now giving way to gas and electricity, is derived from petroleum. In some places it is called coal oil, because it was first manufactured from coal. Paraffin oil, made from shale in Scotland and elsewhere, is a similar substance.

Illuminating oil was first successfully produced from coal in France and England shortly before Dr. Abraham Gesner, who gave his product the name kerosene, developed a commercial process for it in Prince Edward Island, in 1846. The existence of petroleum had been known from earliest times, but it had been little used for lighting because it gave off much smoke and soot. Dr. Silliman of Yale College determined by experiments that kerosene was contained in petroleum. In 1856 a well was bored in Pennsylvania, and kerosene soon became a staple article.

Until the gasoline engine came into common use, kerosene was the chief product of petroleum, but to-day it is of secondary importance and is becoming a drug on the market. This is due to the fact that the quantity of kerosene increases with the increasing production of gasoline. Experiments are now being made for the purpose of testing the value of kerosene as a fuel for internal-combustion engines, and should it be found practicable for this purpose, undoubtedly it will some day rank with gasoline as a marketable commodity.

Good kerosene will not give off inflammable gases at a lower temperature than 110° F. It is generally a colorless liquid, though sometimes it has a red tinge. See article PETROLEUM, with which is a map of the petroleum fields of the United States.

KES'TREL, or **WIND'HOVER,** a common bird of prey belonging to the falcon family, found throughout Europe and in Asia and Northern Africa. It feeds principally on insects, frogs, mice and other small animals, and lays its five creamy-white, brown-spotted eggs in the deserted nests of crows, among rocks, in hollow trees or in ruins of buildings. It is sometimes called *windhover* on account of its habit of hanging in the air for a minute or two in the same spot, beating its wings rapidly, with head turned windward. The kestrel is one of the smallest of its family, being only about a foot in length; it resembles the American sparrow hawk in size and color. The male is ash-gray, and the female is a rusty reddish-brown. In the days of falconry this bird was used only by the lower classes, a custom which gave rise to the term *kestrel* as an expression of contempt. See FALCON.

KETCH'UP, or **CAT'SUP,** a word derived from the Malay *kechap,* is the name of a sauce introduced from the East and widely employed as a seasoning for gravies, meat and fish. Formerly mushrooms constituted its chief ingredient, but now tomatoes (green and red), cucumbers, walnuts, apples, etc., are used in making a number of choice varieties. A good recipe is as follows: Put into two quarts of tomato pulp, one onion cut fine, two tablespoonfuls of salt and three tablespoonfuls of brown sugar. Boil until thick, then take from the fire, straining carefully until it is all through but the seeds. Return to the fire and add two tablespoonfuls of mustard, one of allspice, one of black pepper and one of cinnamon, a teaspoonful of ground cloves, half a teaspoonful of cayenne pepper, one grated nutmeg and one pint of good vinegar. Boil together until it will just run from the mouth of a bottle. It should be stirred frequently so as not to burn. Seal tight while hot in large-mouthed bottles. For those who do not like highly-seasoned foods, the quantity of spice in the above recipe may be reduced.

KEWANEE, ILL., a mining and manufacturing city in Henry County, in the northeastern part of the state. The Indian name, meaning *prairie chicken,* was chosen by the first settlers, who arrived from Wethersfield, Connecticut, in 1836. The town, which was chartered as a city in 1897, adopted the commission form of government in 1910.

Kewanee is on the Chicago, Burlington & Quincy Railroad and the Galesburg & Kewanee electric line, 132 miles west and south of Chicago and fifty-five miles northwest of Peoria. The area is three square miles. In 1910 there were 9,307 inhabitants; the number had increased by 1916 to 14,230 (Federal estimate), and included many foreigners, principally Swedes, Germans and Belgians.

About 4,000 people are employed in the manufacture of tubes and boilers, agricultural implements, water-supply systems, gasoline engines, steam-heating apparatus, pumps, workingmen's gloves and mittens. Coal is mined in the vicinity.

The city contains a Federal building, erected in 1911 at a cost of $75,000, a Carnegie library, an armory, a Masonic Temple, Y. M. C. A. building, Saint Francis Hospital, a $100,000 hotel and several attractive parks. C.J.K.

KEY, *Kee*, in modern music, a term designating the scale in which a composition is written; it comprises not only the tones of the staff itself but all the chords constructed upon those tones. Each key is named for the keynote, or *tonic*, from which it is started, and there are as many keys as there are scales—twelve major and twelve minor. The key of C, having no sharps or flats, is called the *normal*, or *natural*, key. The name *key* is also given in music to a mechanical contrivance for opening or closing certain sound-holes on wind-instruments, and to the levers composing the keyboard of pianos, organs and other keyed instruments. See SCALE.

KEY, FRANCIS SCOTT (1780-1843), the author of one of America's favorite songs, *The Star Spangled Banner*. What inspired him to write the patriotic verses that have made him a permanent figure in the literary annals of his country is told in these volumes under the heading *Star Spangled Banner*. Key was born in Frederick County, Md., and was educated at Saint John's College, in Annapolis. Beginning the practice of law in Frederick in 1801 he rose to the position of district attorney of the District of Columbia. Before the *Star Spangled Banner* he wrote a number of other poems, and in 1857 they were collected and published.

FRANCIS SCOTT KEY

KEY STONE, a name given to the brick or stone at the top of an arch, which is put in last to give strength to the structure, and which is used to lock or key the whole together. In ancient Roman architecture the keystone was usually carved or otherwise decorated. Pennsylvania is often called the *Keystone State* because of its geographical position, being the seventh or middle, of the thirteen original states of the Union. See ARCH.

KEY WEST, FLA., the southernmost city of the United States, world famous for the manufacture of cigars. It is a port of entry, a United States naval station, a noted health resort and the county seat of Monroe County. Its site is on Key West Island, the most westerly of a group of coral islands in the Gulf of Mexico, known as the Florida Keys. Cape Sable is sixty miles northeast, Havana is nearly 100 miles southwest and Tampa is 240 miles northwest, by water; Miami is 150 miles northeast and Jacksonville 500 miles north, by rail. The Oversea Extension of the Florida East Coast Railway, a triumph of railway construction, connecting Key West with the mainland, was opened to traffic in 1912, and railway connections for the north are made at Miami. Steamers ply regularly between this port and the important ports on the Atlantic and Gulf coasts, and with the West Indies and Central America. The population increased from 19,945 in 1910 to 21,724 in 1916 (Federal estimate). Two-thirds of the inhabitants are Americans and one-third are Cubans, the latter being largely engaged in the tobacco industry. The area of the city is two and one-half square miles.

Key West is a beautiful place with broad streets, attractive homes and luxuriant tropical vegetation, almond, cocoanut, palm and oleander trees being grown in abundance; its mild climate attracts large numbers of transients in winter and summer. The island is covered only by a thin layer of soil, and its average elevation above sea level is about eleven feet. The harbor is safe and commodious and is defended by Fort Taylor and other more modern fortifications. In connection with the naval station there are extensive docks, repair yards, barracks and a marine hospital. This naval station has one of the most powerful wireless telegraph plants in the world.

Besides its extensive cigar factories, which employ about 6,000 people, Key West has a large fishing industry, the waters abounding in a great variety of fine fish, including tarpon. The headquarters of a large sponge-gathering fleet is here, and the turtle-shell and coral industries are important. Though the government has erected two lighthouses in the harbor and others among the islands, a great many wrecks occur each year, and they are the source of a profitable wreckage business. Key West has immense shipping interests, local, coastwise and foreign. The buildings worthy of note are a Federal building, court-

house, city hall, First National Bank building and the two Martello Towers. Besides the public and parochial schools, the city has a library, Ruth Hargrove Institute (Methodist), the Convent of Mary Immaculate and Holy Name Academy; the last named was used as a hospital for soldiers during the Spanish-American War.

Key West, locally known as the *Island City*, was settled in 1822, and a city charter was granted in 1832. Though unimportant for many years, in 1890 it was the largest city in the state; it now ranks fourth, after Jacksonville, Tampa, and Pensacola. During the Spanish-American War in 1898 Key West was the harbor of the North Atlantic Squadron of the United States navy. The name is derived from the Spanish *Cayo Hueso*, meaning *bone key*, or *island*. See FLORIDA, page 2216, for map of Key West. A.H.MC I.

KHAMSIN, *kam'sin*, or *kam seen'*, the name of a hot wind which has its source in the Sahara Desert and blows towards Egypt during the spring months. It is called *khamsin*, the Arab word for *fifty*, because it blows usually for fifty days, filling the air with hot, stinging sand.

KHAN, *kahn*, or *kan*, a Persian word meaning *prince*, is a title given to Oriental rulers and commanders, particularly through Central Asia. In some places it is joined to the surname, and in others it indicates merely a man of rank. It is first found in manuscripts of A. D. 560. One of the most illustrious characters who have borne the title is the celebrated Genghis Khan (which see), the first conqueror of the Mongols.

KHARKOV, *kahr'kawf*, a city in Southern Russia, capital of the government (province) of Kharkov, situated about 420 miles southwest of Moscow. It is built in a marshy district on three small streams; two railroads and several canals give it considerable commercial importance. It has large cigar and tobacco factories, soap factories and a sugar-refining establishment, and maintains a thriving trade in live stock, which is carried on mainly at four fairs every year. The city possesses a university, a technical school, a theological academy, a medical school and a number of secondary and special schools. Population, 1912, 248,000.

KHARTUM, or **KHARTOUM**, *kahr toom'*, the capital of Anglo-Egyptian Sudan and at one time its most important town, is situated on the left bank of the Blue Nile, near its junction with the White Nile, and on the Cape-to-Cairo Railway. As the center of the great caravan routes from the interior of Africa, Khartum early became noted for its activity in the slave trade, but to-day it carries on a thriving trade in ivory, ostrich feathers, gums and senna, which are exchanged for European goods. In 1830 the city was made the seat of the governor-general of the Egyptian Sudan, and it, too, has shared the evil fortune of the Sudan region. In 1885 Khartum was taken by the Mahdi (which see), bent upon the crushing of Turkish rule in the Sudan. The entire British garrison was massacred, including their commander, the heroic General Gordon. In 1898 the city was captured by Lord Kitchener's forces, and the power of the Mahdi was broken. Population in 1912, 32,180, including, in addition to the natives, the varied elements of a characteristic Egyptian town. See GORDON, CHARLES GEORGE.

KHAYYAM, *ki yahm'*, OMAR. See OMAR KHAYYAM.

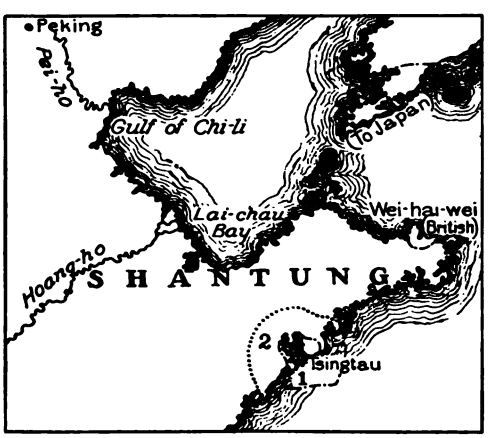
KHEDIVE, *keh deev'*, the official title of the ruler of Egypt. In 1867 it was conferred by the sultan upon his subordinate, Ismail Pasha, the viceroy of Egypt, and since then it has become the recognized official title of the latter. The word is derived from the Persian *khidiv*, meaning *sovereign*, which is a more dignified title than the former one of *vali*, viceroy. Until the War of the Nations the khedive was a viceroy of the sultan of Turkey; he is now dependent entirely on Great Britain, as an English adviser is present at meetings of the Egyptian Council and may veto any measure.

KHIVA, *ke'va*, a small state in Asia which pays tribute to Russia. It lies south of the Aral Sea, 300 miles east of the Caspian, and north of the Russian Transcaspian province. Peter the Great in 1717 and Czar Nicholas I in 1839 both attempted to make Khiva a part of their country, and in 1873 its subjection was accomplished. Though independent in name, it is practically a vassal state. This little country, which is ruled by a native khan, is about 24,000 square miles in area and has a population of 646,000. The principal commercial products of the country are silk, cotton and rugs. The rugs of Khiva are classed among the so-called Turkish rugs and are of excellent quality, although regarded as inferior to Persian rugs. Khiva, the capital city, has several large Mohammedan colleges and many bazaars, or Oriental shops. It is fortified by walls and earthworks. The Russian railroad

from the Caspian Sea to Samarkand is making the country commercially important.

KHYBER PASS or **KHAIBAR,** *ki'bahr,* **PASS,** the most remarkable pass in the world, geographically, and historically important possibly next to Thermopylae. It is situated in Northwest India, and connects the Punjab with Afghanistan. At the narrowest point it is only ten feet wide, and its length is about thirty-three miles. The pass is the only practicable route between India and Afghanistan for travelers, caravans and artillery, and its strategical importance dates from the days of Alexander the Great. Afghan fortresses are in command of the pass, but Great Britain's influence is dominant. It is declared there can be no land invasion of Great Britain's immensely rich Indian Empire so long as Khyber Pass can be successfully defended. See AFGHANISTAN.

KIAO-CHOU, *kyou'chou',* a district containing about 200 square miles on the southern coast of the Shantung Peninsula, in Northern China, leased by the Germans in 1898 but surrendered to the Japanese in 1914. Back of this



KIAO-CHOU AND VICINITY
(1) The German port, before the War of the Nations. (2) Neutral zones, thirty-two miles wide.

province is a Chinese walled city of the same name. At one time an important commercial port of Kiao-chou Bay, it has become an inland city through the gradual filling in of the harbor. In 1897 Germany seized the district of Kiao-chou in retaliation for the killing of two German missionaries. The Germans secured a ninety-nine year lease from China and bought Tsing-tau, then a small fishing village on the eastern shore of Kiao-chou Bay. They practically rebuilt the place, making it a prosperous and beautiful city, and erecting a chain of eight forts for its protection. Tsing-tau thus became a strong naval base as well as a commercial center.

Shortly after the beginning of the War of the Nations in Europe, in August, 1914, Japan, the ally of Great Britain, demanded that Germany surrender the district of Kiao-chou, and on Germany's refusal began a siege of Tsing-tau. After a bombardment by land, sea and air, it surrendered on November 6, and was at once placed under Japanese administration Population of the district, including the city of Kiao-chou, about 168,000.

KICKAPOO, *kik'a poo,* a tribe of Algonquian Indians, who formerly occupied reservations in the Ohio Valley and were prominent in the history of that region until 1819, when they removed to Missouri and afterward to Kansas. About 1852 a large number of the tribe went to Texas, then to Mexico, and in the border settlements their native warlike spirit made them so turbulent that the government made efforts to have them return; consequently, in 1873, about half the number removed to the north and settled in the present state of Oklahoma. They were successful agriculturists. There are only about 900 Kickapoo Indians surviving (1916); of these one-third are in the United States, and they are gradually decreasing. The remainder, who live in Mexico, are said to be increasing in number. See INDIANS, AMERICAN.

KIDD, WILLIAM (?1650-1701), a British navigator distinguished for bravery in the wars of his country against France, but who became famous later as CAPTAIN KIDD, a notorious pirate. He was born at Greenock, Scotland, the son of a Scotch minister, and went to sea at an early age. As a young man he was commander of a commissioned British vessel in the West Indies, operating against his country's enemy, France. In 1695 he received a commission to pursue and capture pirates on the high seas, and in 1696, as commander of the galley *Adventure,* carrying thirty guns and a crew of eighty men, he sailed from Plymouth, England, to New York, where he increased his crew and then proceeded to Madagascar.

It was soon reported that Captain Kidd was practicing piracy instead of suppressing it, and when he returned to Boston in 1699 he was arrested. The immediate charge against him was that of murder, for he had killed a gunner of the *Adventure* during a mutiny. He was sent to England, where he was tried, condemned and executed. The treasure which

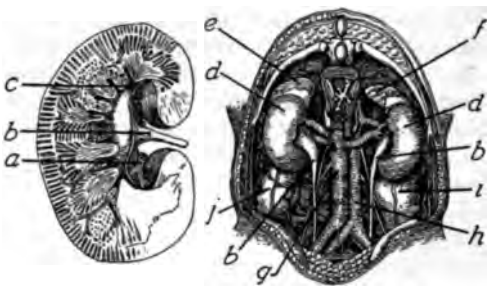
he had secured during his unlawful career and had buried on Gardiner's Island, N. Y., was secured by the Colonial authorities in 1699. For many years tales of still greater buried treasure which the authorities had failed to find stirred men's imaginations, but eventually attempts to find it ceased. The adventures of Captain Kidd inspired many romances, notably Poe's *The Gold Bug,* and Robert Louis Stevenson's *Treasure Island.*

KIDNAPING, *kid'nap ing,* also spelled KIDNAPPING, is the name commonly applied to the act of taking possession of a person without his consent, or the consent of one who has authority over him, and of depriving him of his freedom. The word originated with the slang words *kid,* referring to a child, and *nab,* a low term for *to steal.* Formerly it was applied to children only, but now is used also in cases where adults are kidnaped. Merely enticing an adult person with flowery promises does not constitute a crime, but making him incapable of using his will power or deceiving him as to the purpose in transporting him and detaining him without his consent makes the act a crime, which is punishable by imprisonment for from ten to twenty-five years. Practically all civilized countries have passed laws defining the meaning of kidnaping and imposing penalties for the punishment of those convicted of this crime. See ABDUCTION.

KIDNEYS, *kid'niz,* two large filter glands located in the small of the back, one on either side of the backbone. They extend downward from the eleventh rib to the highest point of the hip bones, the right kidney being placed a little lower than the left, to make room for the liver. The function is to separate from the blood urea and other waste materials which are excreted from the body in the form of urine. Blood is carried to the kidneys through the *renal artery,* and returns to the heart through the *renal vein* and the lower *vena cava.* Two small tubes about the size of the quill of a crow's feather, the *ureters,* carry the waste matter from the kidneys to the bladder, a large oval pouch lying low in the pelvis. Urine is expelled from the bladder through the *uretha.*

These important filtering organs are shaped much like beans, with the concave or depressed side of each inward and the convex side outward. They are about four inches long, two and one-half inches wide and one and one-half inches thick, and are purplish-brown in color. Each contains a network of tiny blood vessels which are twined around millions of kidney tubes; the cells of these tubes have the power to separate the urea and other waste matters from the blood.

Diseases of the Kidneys. As the kidneys in health pour out from three to four pints of urine every day, anything that interferes with



CROSS SECTION OF A KIDNEY AND LOCATION OF THE KIDNEYS

(*a*) Branch of renal artery
(*b*) Ureter
(*c*) Renal calyx
(*d*) Kidney
(*e*) Spleen
(*f*) Liver
(*g*) Aorta
(*h*) Vena Cava
(*i*) Ascending Colon
(*j*) Descending Colon

their work of excretion is liable to cause an accumulation of poisons in the body. Diseases of the kidneys are therefore a matter of grave concern. Sometimes these organs become diseased because of failure of the skin to take care of its work of excretion; as a result the kidneys have an extra amount of labor thrown upon them. Every person should help the kidneys do their work by keeping the pores of the skin clean and healthy. The germs of various infectious diseases, including scarlet and typhoid fevers, tuberculosis and grippe, are an important source of kidney trouble and may cause such dangerous ailments as Bright's disease. The habitual use of alcohol also has a harmful effect on these organs. W.A.E.

Related Subjects. A wider view of the importance of the kidneys will be obtained by reference to the following articles in these volumes:

Baths and Bathing
Bright's Disease
Circulation of the Blood
Gout
Urine

KIEL, *keel,* the most important naval center of Germany, the headquarters of the German Baltic fleet and the chief town of the province of Schleswig-Holstein in Prussia. It is about fifty-three miles northeast of Hamburg, on the Bay of Kiel, an arm of the Baltic Sea. It consists of a somewhat cramped old town and a better built and more spacious newer part; the port and its approaches are very strongly fortified. The city carries on an

extensive trade with Denmark and Sweden, exporting coal, flour, beer, butter, cheese and fish. The chief industry is shipbuilding, and the city contains the imperial shipyards; but there are also in operation iron foundries, engineering works, oil mills and various manufacturing establishments.

A great ship canal, of which Kiel is the eastern terminus, connects the Bay of Kiel with the North Sea, and is known as the Kaiser Wilhelm Canal. In 1914 this canal was officially ordered closed until the conclusion of the War of the Nations (which see). Kiel is the seat of a university, founded in 1665; and a castle, built in the thirteenth century, houses the university library of over 319,000 volumes and a museum with noted sculptures by Thorwaldsen. Population, 1910, 211,620.

Kiel Canal, the popular name applied to the KAISER WILHELM CANAL (which see).

KIEV, *ke'yef,* the oldest of the famous cities of Russia, hence called the "mother of Russian cities." It is situated on the Dnieper, about 670 miles south of Petrograd. It is the capital of the government (province) of the same name, and is divided into three parts—Old Kiev; Podol, the commercial quarter; and the portion containing the old fortifications, known as Petchersk. Its notable ancient churches and monasteries, as well as historical remains, bespeak the story of the prominent part played by the city in the political and ecclesiastical history of the nation. After the introduction of Christianity into Russia, Kiev became a prominent religious center. The Petcherskaya Lavra, one of its most celebrated monasteries, founded in the eleventh century, contains the tombs of many ecclesiastical dignitaries, and its treasury is filled with ancient Bibles, sacred vessels and ecclesiastical costumes. Kiev has a good harbor and its trade, chiefly in beet sugar, tobacco, paper, chemicals, preserved fruits, grain, timber and hardware, is extensive. Population, 1911, 506,000.

KILAUEA, *ke lou a'ah,* a continuously active volcano in the southern end of the island of Hawaii, on the eastern slope of the larger volcano of Mauna Loa (which see). Since August, 1916, it has been a part of the Hawaiian National Park. Kilauea is a great hole in the mountain side, three miles long, two miles wide and from 200 to 700 feet deep. In the southwestern part of this huge crater is a pit or lake of boiling lava, which the natives call the "House of Everlasting Fire." Sometimes this lava sinks suddenly to a depth of 1,000 feet; again it rises almost to the surface of the crater; but always its thickly-bubbling mass, across which play streaks of fire and from which rise, from time to time, blazing fountains, affords an awesome sight. In times of great activity the whole floor of the crater becomes fluid, and the lava pours out through cracks in the wall and flows down toward the sea. Such eruptions occurred in 1789, 1823, 1832, 1840 and 1868, but they seem to have no connection with the outbursts of neighboring Mauna Loa. See HAWAII, subhead *The Land.*

KILIMANJARO, *kil e mahn jah'ro,* an extinct volcano in East Africa, about 100 miles inland from Mombasa, with double peaks named Kibo and Mawenzi. Kibo, rising 19,710 feet above sea level, has a summit crater about 600 feet deep, and is the highest point on the continent; the other peak reaches a height of 17,570 feet. All vegetation ceases at 14,500 feet, while several large glaciers have been found near the top. Hans Meyer, who ascended the mountain in 1889, was the first man to reach the summit.

KILLARNEY, *kil ahr'ni,* a small market-town of Ireland, in the county of Kerry, 185 miles southwest of Dublin. One and one-half miles distant cluster the three celebrated connected lakes to which this little town has given its name, and which are famed in Irish song and story. These lakes are situated in a basin in the midst of the mountains of Kerry, some of which, rising abruptly from the water's edge, are enveloped in a wealth of trees from base to summit. Many richly-wooded islands contribute to the picturesque grandeur of the lakes. The largest of these is Ross Island, containing Ross Castle, an old stronghold of the O'Donoghues, about whom center many of the interesting legends of the district. Another island of note is the "sweet Innisfallen" of Moore's song; here is situated the magnificent ruin of an abbey founded in the sixth century.

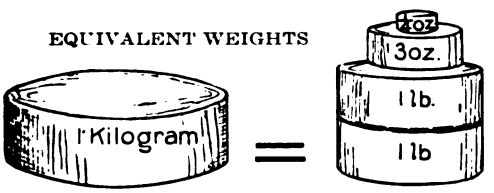
Midway in the course of the curiously-winding stream which connects the lakes is a famous echo, caused by a lofty rock known as Eagle's Nest. The arbutus grows abundantly on the islands and lakes, and the thrifty people of Killarney have developed a lucrative trade from the fancy articles they whittle from arbutus wood and sell to attract the thousands of tourists who stop here annually on their way to the famous lakes near by.

KILL'DEER, a widely-known bird of the plover family, common throughout North America from Newfoundland and Manitoba

southward. It is so named from its plaintive note resembling *kill dee, kill dee.* It is a noisy, restless bird, and while nesting takes fright and screams at the slightest sound. To attract attention to itself and away from its nest it will feign lameness, and go limping along, dragging one wing. See PLOVER.

KILN, *kil,* or *kiln.* See BRICK AND BRICK-LAYING; CHINA PAINTING.

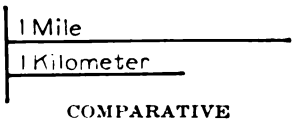
KIL'OGRAM, a standard of mass in the French system of weights and measures, equal to 1,000 grams, or approximately 2.2 pounds. The metric system of weights is now the standard in many countries of Europe and in



most of the countries of the two Americas. In the United States and Canada it is still confined almost exclusively to scientific work, although it is used largely in the collection of customs duties. See METRIC SYSTEM, for extended comparisons.

KILOGRAMMETER, *kil o gram' me ter,* a unit of measurement in the metric system. It is the measure of the work done in raising one kilogram of matter (2.2 lbs.) one meter (about 39 inches) against the force of gravity, and is equal to about 7.233 foot pounds, a foot pound being the work done in raising a one-pound weight one foot against the force of gravity. Except in the scientist's laboratory the kilogrammeter is not used to any extent in America. See METRIC SYSTEM.

KIL'OMETER, one thousand meters in the French system of measurement, each meter representing practically 39.37 inches. It is equal to three-fifths of a statute mile, less nineteen feet and eleven inches. In the United States and Canada the term was once confined largely to scientific writings, but is now encountered with some frequency in newspapers and other works of an unscientific character. Especially after the outbreak of the War of the Nations in 1914 did the word assume importance to readers of newspapers, for the rate of advance or retreat of armies was announced in kilometers instead of miles. An advance of ten kilometers meant practically six miles. See METER; METRIC SYSTEM.



COMPARATIVE DISTANCES

KILOWATT, *kil'o waht,* the practical unit of measurement of electrical energy, in universal use even in such countries as have not elsewhere adopted the metric system. The kilowatt equals 1,000 watts, a current being said to have a power of one watt when the pressure is one volt and the flow one ampere. It requires 746 watts to equal a horse power, and consequently the larger unit, the kilowatt, is the one commonly employed in practical work. The electric unit was named in honor of James Watt, a Scotch engineer who did much to perfect the steam engine.

Related Subjects. The reader is referred to the following articles in these volumes:

Ampere	Volt
Electricity	Watt

KILPATRICK, HUGH JUDSON (1836-1881), an American soldier who won distinction as a cavalry leader during the War of Secession. He was born on a farm in New Jersey, was graduated from West Point in 1861 and immediately became captain in a New York "zouave" regiment. In the second Battle of Bull Run and at Gettysburg he was especially conspicuous for daring and for skill, and meanwhile he conducted a number of cavalry raids. During Sherman's march to the sea Kilpatrick rendered efficient aid in guarding his communications, and for this and other services he was advanced to the rank of major-general in the regular army. After the war he was minister to Chile.

KIMBERLEY, *kim'ber li,* a town in South Africa, capital of Griqualand West, in the province of Cape of Good Hope, which owes its prosperity and existence to the mining of diamonds, which began in 1870. It is situated 647 miles northeast of Cape Town. Diamonds to the value of over $300,000,000 have been mined around Kimberley. During the South African War the town was besieged by the Boers for 123 days, from October 15, 1899, until February 15, 1900, when it was relieved by General Sir John French. Population, 1911, 29,500. See DIAMOND.

KINCAR'DINE, a town in Bruce County, Ontario, which by reason of its climate and its picturesque location on Lake Huron has become a popular summer resort. Its population in 1911 was 1,956, but this is largely increased during the summer months. The town has a pork-packing plant and manufactories of timber products and steel products.

KINDERGARTEN, an institution for the progressive development of children between the ages of three and six years, by means of organized play. It was devised by Friedrich Froebel in Blankenburg, Germany, in 1837, to meet the needs of children below the school age and to furnish a natural basis for their later education through the agency of books. The name, which signifies a *garden of children,* implies that education is primarily a process of development, rather than one of mere learning, and that this development can be directed by providing right conditions and the guidance of a person trained for the task. Froebel believed that such an institution was needed to supplement the home, since the child has needs during this period which the home can but partially meet and which the school does not recognize.

These needs arise from the development of his play instincts, and require, for their full satisfaction, the companionship of children of his own age, and the opportunity for experimentation in larger variety than the home can furnish. The kindergarten, therefore, fills the gap that exists between the home and the school. That its work furnishes a real basis for that of the grades has been confirmed by practical experience, as well as by more recent study of the child's development. As a result, the kindergarten has been adopted by all progressive countries, in a greater or less degree.

A Kindergarten Visited. The purpose and method of the kindergarten can be most readily understood by a consideration of its daily procedure. An imaginary visit will assist in making its purposes clear. The visitor does not wonder that the children enjoy a place with so homelike an atmosphere. Here, on each side of a fireplace, are low cupboards that contain quantities of play material of different kinds, and at each end of the room are several small tables, put together so as to form a large one, upon which the children use the material. Under the window seats of the large bay window are drawers filled with picture books and mounted pictures which the children are free to use at certain times. On the opposite side of the room is the piano, and at the end opposite the fireplace is a sand table, that, at this time, contains the children's representation of a near-by park. Under two of the windows are plant stands, on which are boxes filled with ferns or blooming plants. Over the fireplace hangs a *Sistine Madonna,* and on the walls are pictures of children at play.

The room shows many evidences of the children's recent efforts. On a small table is a collection of fall fruits and vegetables, which they modeled the week before and painted in appropriate colors. On a window sill is a tray of envelopes made by the children, to hold the assortment of seeds they have collected for their spring planting. On a screen is a festoon of autumn leaves, and paper cuttings of leaves of different kinds. The ledge above the blackboard is decorated with sprays of bittersweet leaves and berries, and below it hang festoons made of rose hips and pumpkin seeds in alternation. On the mantel is a vase containing barberry twigs with their brown leaves and scarlet berries, and on the piano is another containing milkweed stalks with the pods just bursting into feathery whiteness. The decorative material the children have gathered on their walks together to the near-by gardens, fields and roadsides, along with the vegetables, seeds and fruits, is a part of the harvest which the autumn brings—the harvest of beauty, which has been used for the adornment of their play room in ways of their own suggesting. It is evident that through their play the children have shared in the thought and effort of mankind during the autumn season.

The Program of Exercises. The work of the morning gives further evidence of their participation in the thought of the season. At a signal, the children bring their chairs to the circle for the opening period of conversation, song and story. The song of greeting is followed by several autumn songs of their own choosing. Since it is Monday, the children are

bubbling over with stories of their week-end experiences, which they are encouraged to tell. The kindergartner tries to connect each child's contribution with some phase of their previous work or play. In order to connect the children's thought of the country more closely with their own lives, she tells a story of the little boy who learned that, although the farmer took many things from the farm to the city children, he always had to take back from the city some things that his children at home needed. She then asks the children whether they would like to tell this story with their blocks. The suggestion meets with ready assent.

Since the period of conversation and story has occupied nearly half an hour, a period of games follows, that the children may have opportunity for exercise before proceeding with their building. In this, the memory of park playground apparently lingers in the children's mind, as the merry-go-round is the first game asked for. In this, the children form two circles, one within the other, both facing inward. The children in the inner circle join hands and form the merry-go-round, while those on the outer circle "ride," each one placing his hands on the shoulders of a child in the inner circle, ready for the dancing around the circle together. This suggests the dancing of the leaves, as the next game asked for is "Like a Leaf or Feather," in which the children imitate dancing leaves. A sense game with fruits and vegetables follows, and "The Apple Man" brings the period to a close.

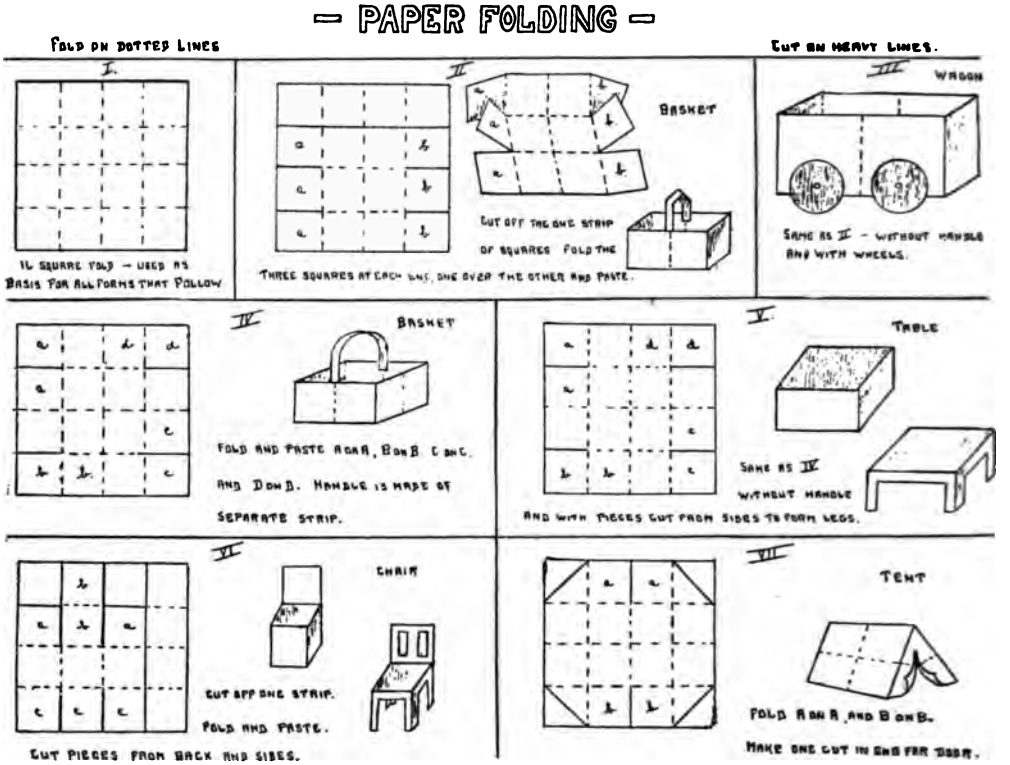
The children now form into two groups, one of which goes to the farther table to continue work upon several sets of doll furniture, to be used in the near future for the furnishing of a doll house. The children in the remaining group move the small tables away, leaving a clear floor space across the end of the room. Six of the children are selected to make the farmer's fields and buildings at one end of the space, while the others build the city houses and stores at the other. The children get from the cupboards the enlarged fifth and sixth gift blocks, and begin their building on the floor. Since they have used this material many times, it is not long before the farm buildings are ready in the one space, and the city street, with homes and stores, in the other. The children then represent the farmer taking his produce to the city, by means of a toy horse and wagon, and his returning to his home with his wagon laden with articles from the city stores. The other group of children is invited to see the city and country picture. The "picture" in question is left on the floor to be enjoyed further. The session closes with a period of songs, finger rhymes and stories retold by the children.

Some Conclusions. From such a morning's work, the thoughtful observer cannot fail to draw several conclusions. The first one is that the children's happiness in their work and play must have its source in the satisfaction of certain fundamental needs—the companionship of their equals and occupation in line with their interest and ability. Another conclusion is that the child gardener needs thorough and varied training in order to know how to utilize the children's play interests in such a manner as to further their progressive development. In order to do this successfully, she must observe their unguided play, for the purpose of discovering their native interests, to the end that she may wisely plan her work for them. A further conclusion is that, since children's needs vary, several lines of work are required to satisfy them, and these, woven together informally, constitute the kindergarten program of exercises.

From the program described, it is evident that nature observation had been emphasized, and that certain observations formed the thought basis of the work done. The different lines of work carried out—the play with material, the games, the songs and the stories—all served as means of expression of the children's thought. That the work in these several lines cannot fail to send the children into the primary grades prepared to take up the work there successfully, is another conclusion that cannot fail to be drawn.

How It Meets the Children's Needs. To understand the true significance of the kindergarten, it is necessary to consider the means and methods by which it meets the children's varying needs.

Among these, the need for companionship with children of the same age is one of the most insistent. In the home, the child is too often either a monarch or a subject. In the kindergarten, he is an individual among his equals. From his play there—at one time with a little group, perhaps of his own choosing, and at another as a member of the whole—he experiences the joy of mingling with his fellows and is stimulated to his best effort by the opportunity for comparing his own achievements with those of his companions. The

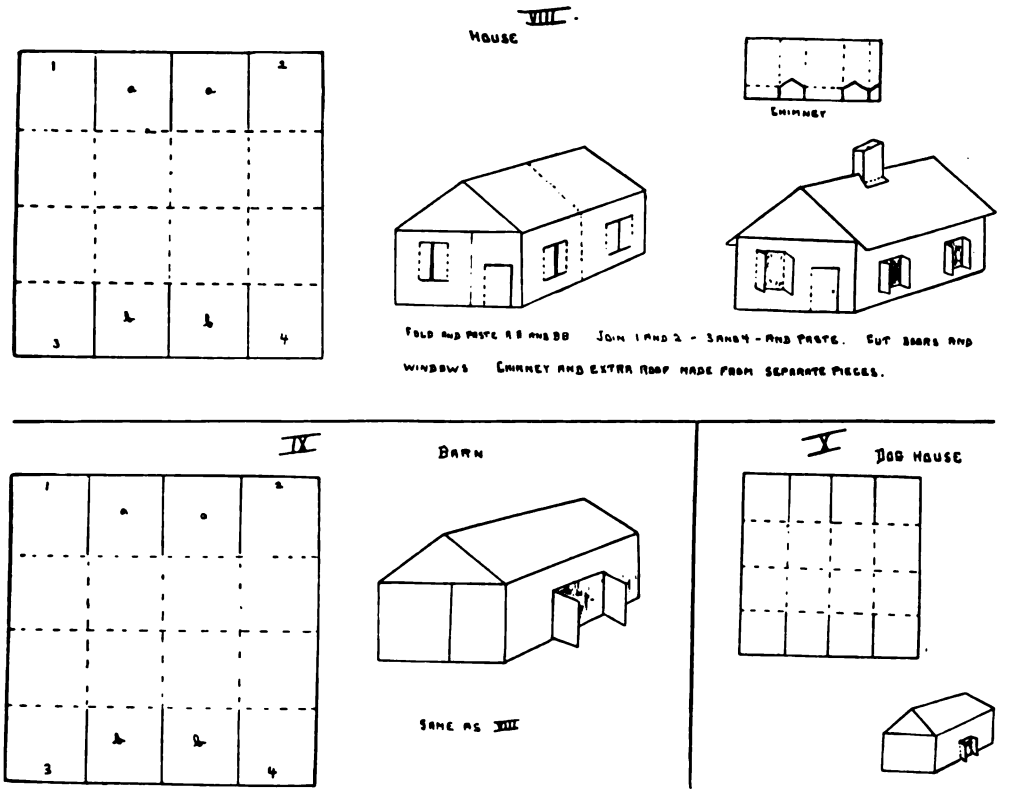


joys of companionship are often interrupted, however, because the members of the little company have not yet learned the laws of right conduct. The children learn these laws readily, however, by the experience of losing favor with their playmates if they offend. It is through such experiences that they come to realize right conduct as a means to a desirable end—happiness in their play together. Many of the kindergarten exercises afford opportunity to prove this, but none more so than the games, because they are so largely coöperative. In the playing of these in the right spirit, the children's joy in each other's companionship reaches its height.

Some Purposes of the Games. It is because the games meet so many of the children's needs that they deserve especial attention. Among these are the physical ones. The period from three to six years is one of such rapid growth that energy is generated faster than it can be used. This is the reason why children run, jump and dance in sheer joy in the activity. It is for the purpose of affording the right exercise for this overflowing energy, which cannot be repressed without injury, that the various running, skipping and dancing games have been evolved. Since these are necessarily rhythmic, they not only aid the children in gaining control over their movements, but become the means by which they learn to understand and express music on its rhythmic side.

To give opportunity for such expression, exercises in which children "do what the piano tells them to do," that is, march, skip, dance, or run, have come into vogue. With such exercises as a basis, the children have no difficulty in learning the games of another group—those in which they dramatize the activities of adults—of the mother in the home, the farmer in the field, or the carpenter or blacksmith in his shop. These not only satisfy the imitative instinct, but acquaint children with fundamental forms of human effort, and the place and value of these in life. They have, therefore, a double social value—that gained from a knowledge of the activities imitated, and from the children's playing them together.

No list of kindergarten games could be considered complete that did not include still other games—those in which children measure their strength, skill, or alertness with that of others. Of these, such games as "Drop the Handkerchief," "Dodge Ball," and the many



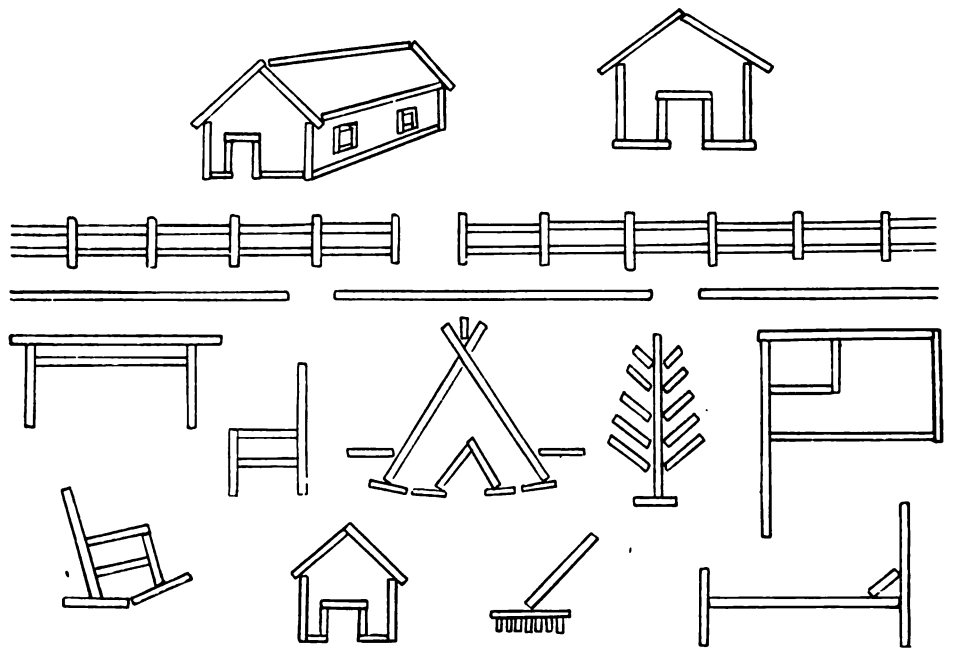
sense games and hiding games are examples. These serve to stimulate children in new ways and contribute a new element to their enjoyment. In view of the varying needs which the games meet as a whole, and the opportunity for happy comradeship which they afford, it is not surprising that they should be rated among the most valuable of the agencies which the kindergarten employs for the child's development.

Purposes of the Work with Materials. Because it furnishes the child with occupation as well as companionship, the kindergarten meets another of his fundamental needs. It does this by means of its organized play material. This was originally devised by Froebel, but has been improved in recent years, as the result of a better understanding of the child's development. It consists of a series of educative playthings, which Froebel termed "gifts," and plastic materials, such as sand, clay, paper, etc., by means of which the children can carry out their own play motives. The gifts consist of a set of balls, one of each of the six standard colors; of a set of the fundamental forms—the sphere, cube and cylinder; of four sets of cubes, each differently divided for building purposes; and of several series of tablets, sticks, rings, lentils for plat representation. The plastic materials—sand, clay, paper, etc.—are used for modeling, folding, cutting and weaving. These lines of work Froebel designated as occupations. The gifts and occupations were intended to complement each other and to form a system of play material. The general purpose is to provide material that will keep pace with the child's advancing intelligence by its own increasing complexity.

The play with this material satisfies the kindergarten child, because it gives him the opportunity to experiment and to carry out his own play purposes. The material can be used in numberless ways. If the kindergartner wishes to gain an insight into the interests and abilities of the different children, she allows them to choose their material and the use they wish to make of it. Equipped with such knowledge, she can plan work that will satisfy them and lead in right directions.

If she wishes to know how fully the children have grasped the essential features of a house, and what power they have of expressing this, she will give them all the same material, and

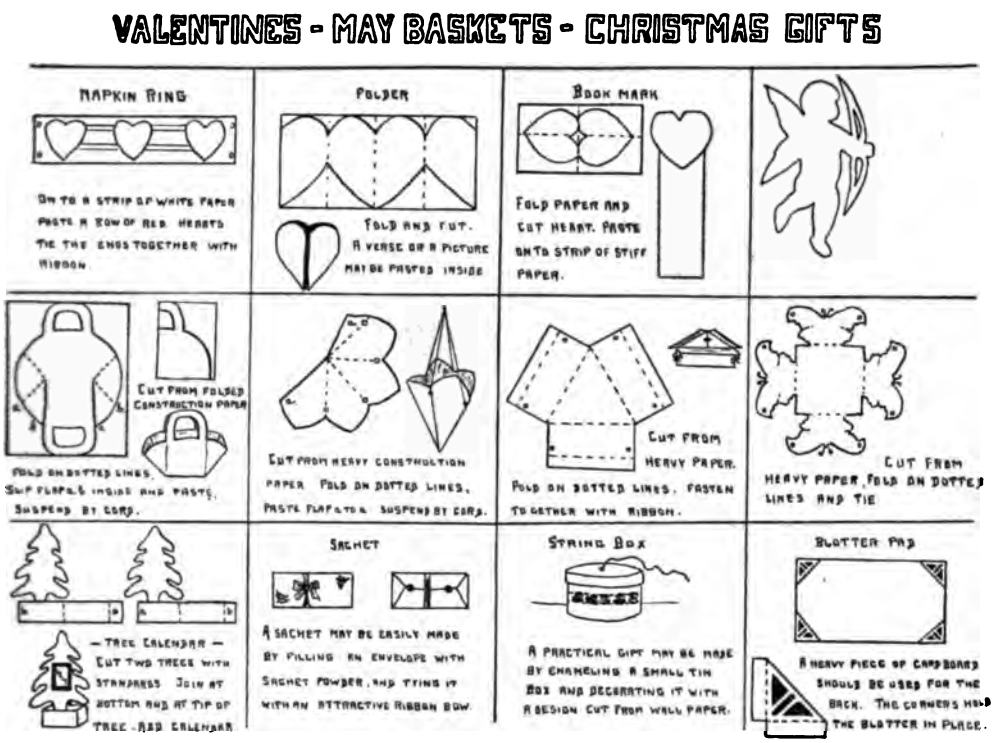
STICK LAYING



ask all to build a house, each in his own way. When these are completed, the houses are examined and their merits discussed. Because of the excellence of some one house, the children may all wish to build one like it. If the children's technique needs improving, the kindergartner may direct the doing of this, calling attention to the way in which the blocks are placed to produce the best effect. If the children had difficulty in making some portion of the house, such as the roof, an exercise in the making of this would be likely to follow in the near future.

At another time, a few children may be selected to work out an idea together—a garden or park on the sand table, perhaps. In this, the children agree upon the general plan of the representation, the best material to use and the part that each is to take. In the process, however, the children may discover the need of additional material—blocks for a seat, colored lentils to represent the flowers in a bed, or paper to represent a tree in some way. Such an exercise leads to the doing of other and related things, such as the modeling of vegetables or the making of folders to contain garden pictures. These are a few of the many ways in which the children use the material to work out their own play interests. The work satisfies them, because it affords opportunity both for individual effort and for effort in common. It gives children a growing sense of power, and gives them a feeling of kinship with the workers of the world. The work with the material, too, ranks high among the agencies which the kindergarten employs.

Other Needs Which the Kindergarten Meets. The child from three to six years has other needs which the kindergarten meets. One of these is the need for out-of-door work and play. For this the garden and nature excursions, to which many references have been made, furnish the best agencies. Owing to climatic conditions and the lack of space, the outdoor garden work is difficult, if not impossible, in large cities. Outdoor games and walks are possible at certain seasons, and a knowledge of gardens, fields and roadsides, with the plant life common to them, can be gained from these. They also afford the opportunity for a knowledge of bird life, and of such pets as children in the neighborhood may have. Such knowledge is indispensable as a basis for several lines of work with the material. It is the care of plants and pets that children need to develop—the right attitude toward living things. In most kindergartens the plants in the kindergarten window box, the seeds which the chil-



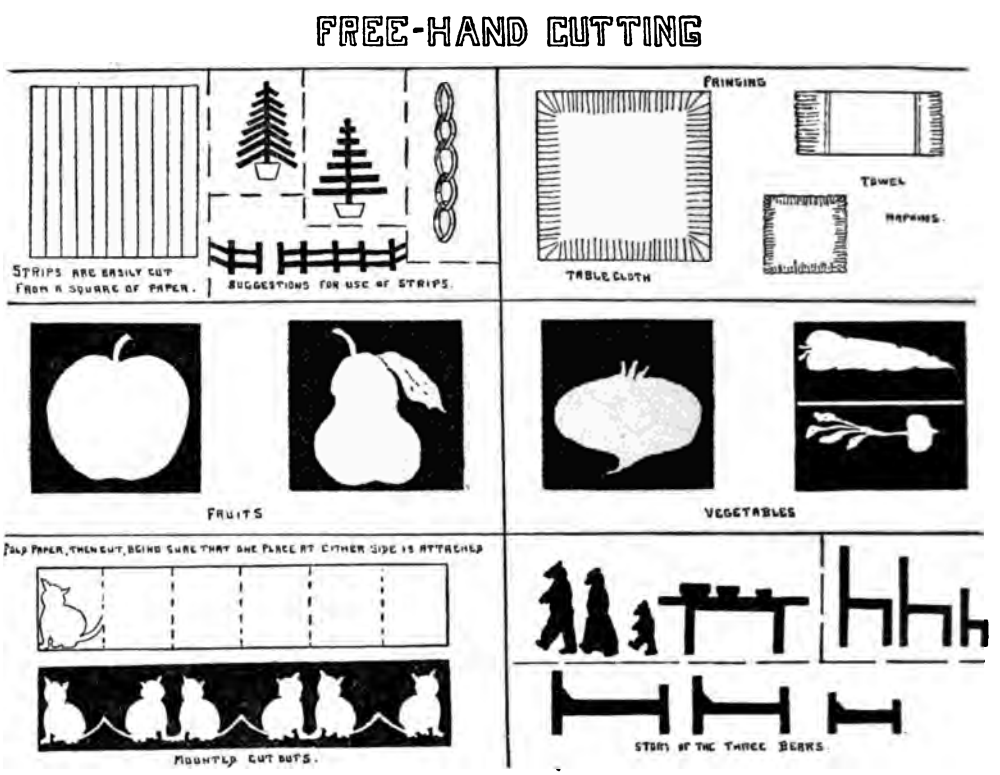
dren plant in spring, and the goldfish in a globe, are the only means by which the attitude can be cultivated.

During the kindergarten years the children have another need that should be met. This is the need for a vocabulary. Because the kindergarten insists upon observation and experience as a basis for expression in material, it provides at the same time an admirable basis for expression by means of speech. In their out-of-door observation and their play with material, words are constantly associated with objects and actions, and the expression of thought in words is a matter of course. In the morning circle the children tell of their home experiences and talk over with the kindergartner the things they have seen and done or which they plan to do together. Sometimes pictures serve to call out stories of their recent experiences, and finger rhymes are taught to help them keep an experience in mind. The story-telling and the children's reproduction of the stories are additional means by which language is acquired and the introduction to literature is made.

Since children wish to sing, even before their voices have evolved from the monotone stage, it is important that they should have also the right beginnings in song. By the selection of songs that appeal to children's interest the skilful kindergartner helps them to gain control of their voices and to sing with pleasing effect. She believes that the little repertoire of songs which she teaches them to sing as they might tell a story will form a nucleus from which will develop a love for beautiful music. Because the importance of right beginnings in music is increasingly appreciated, the musical work of the kindergarten, both from the side of song and rhythm, has received increasing attention in recent years.

It is through the agencies mentioned—the games and songs, the play with material, the outdoor observation and the stories and rhymes—that the kindergarten educates the child during the period when he needs a larger life than that of the home and a freer one than the school is yet willing to accord him. The school itself has gradually adopted these agencies, however, and hence it recognizes their value in the kindergarten, and the significance of the kindergarten as a whole, as it did not in the earlier years. As a result, the kindergarten is being increasingly recognized as the true basis for the work that is to follow. N.C.V.

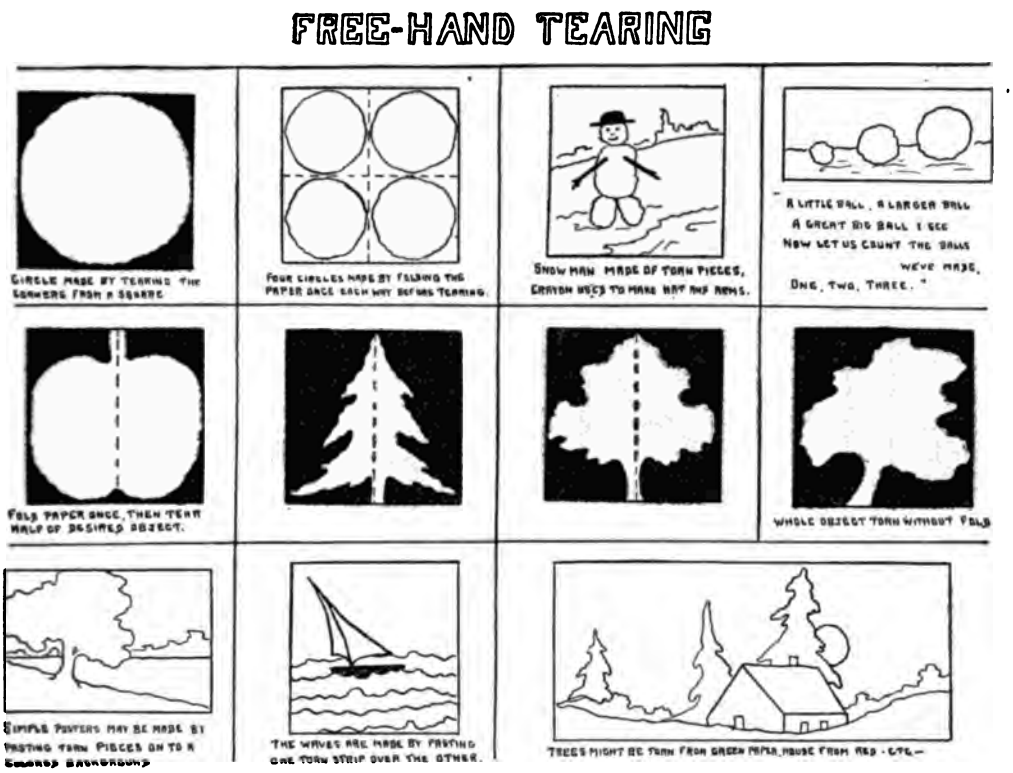
Consult Atwood's *Theory and Practice of the Kindergarten;* Smith's *The Home-Made Kindergarten;* Johnson's *Education by Plays and Games.*



Some Side Lights on the Kindergarten Movement

The kindergarten occupies a place of its own in American life and thought. It won that place by the demonstration of its value for little children. The recognition accorded it has increased, however, as the value of its principles for all education has become apparent. The doctrine that gives it this value is its conception of education as a process of development. It was because this doctrine was at such variance with the prevailing doctrine of education as a process of instruction that the kindergarten awakened such an interest when it first became known, in the decade from 1870 to 1880. It was because a few people at once recognized the doctrine of development as the true one that the kindergarten found advocates from the beginning, and it was because they saw in it an agency for the spread of the new doctrine that they worked for its advancement. In the progress of education, therefore, the kindergarten has been both the source and the consequence of the accepting of the new educational ideals. So closely interwoven has the kindergarten been with the improvement of general education that the two can only be considered as parts of the same story. The story is an interesting one, but too long for these pages. A few significant points, however, must be noted in passing.

Woman's Work for Kindergarten Advancement. The kindergarten movement has been called a woman's movement, because of the part that women have taken in its advancement. The efforts of women have contributed greatly to its success, but it has not been a woman's movement only. Among the leading educators who indorsed it from the beginning was William T. Harris, who, as superintendent of schools in Saint Louis in 1873, gave the kindergarten its first trial in the school system. This centered the interest of educators upon it. Next in their interest in the new movement were the mothers of young children, who instinctively recognized that a doctrine so in accord with the nature of childhood must be the true one. Believing that an institution which so interpreted childhood must have a value for mothers as well as for children, they added their influence to that of the educators, urging the study of its doctrines and the adop-

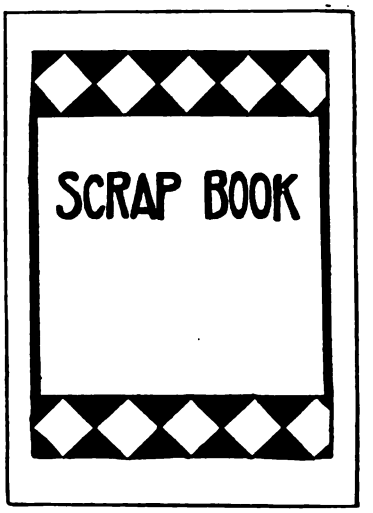


tion of the institution. As a result of the efforts of its increasing numbers of friends, a model kindergarten was made a feature of the Philadelphia Exposition in 1876, and in this way it became generally known. That its message of a higher type of education for young children was understood and accepted is proved by the increase in the number of kindergartens —from ten in 1870 to 400 in 1880.

The growth of the kindergarten movement from these beginnings was brought about by many influences that cannot be traced here. At this time, however—about 1880—the interest of the women took organized form and became an important factor in its development. Realizing that the kindergarten would not be generally adopted unless the people were made acquainted with its purposes and methods, public-spirited women in many communities organized kindergarten associations for the spread of kindergarten intelligence. The work of these associations included the planning of campaigns for the public's enlightenment, the raising of money for kindergarten support, the holding of mothers' meetings and the formation of kindergarten study clubs, the coöperation with school authorities, and other forms of publicity work. These associations, which were organized in several hundred cities and towns during the decade from 1880 to 1890, formed one of the chief agencies through which the people became acquainted with the kindergarten, and it was to the knowledge thus gained that its adoption by schools later was largely due. The kindergarten would doubtless have made progress without that effort, but by means of it the clock of educational progress was set forward many years. Without the multiplication of kindergartens, one factor in that progress would have been lacking. The work of the kindergarten associations was a work by women for women and children. It was undertaken because of their faith in the enlightenment of motherhood as a means to a better and happier childhood, and hence to a better and happier humanity.

Progress of the Movement. The adoption of the kindergarten by the school has made steady progress since the early days. Five of the large cities—Milwaukee, New Orleans, Boston, Philadelphia and Los Angeles—and about twenty-five smaller ones, took this step during the decade from 1880 to 1890. During the next decade, Chicago, Saint Paul, New York City,

BOOK COVERS



Denver, Cleveland, Washington, Kansas City, Buffalo, Pittsburgh and many smaller cities were added to the list. Progress in this direction has continued since the new century opened, the increase covering the number of cities adopting kindergartens, and the number of kindergartens opened in the cities in question. Statistics collected for 1913 showed that during the decade ending with that year, public kindergartens had doubled in New York, New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Michigan, Wisconsin and Iowa. At that time, the number of cities and towns having public kindergartens was estimated at 1,100. This is a good showing for the states mentioned. There are others, however, in which the kindergarten has gained but a very slight foothold. In twelve of these, the number of children enrolled in kindergartens forms but one per cent of the number of kindergarten age. The highest percentage of children in kindergarten is found in New Jersey, where it is twenty-eight. The movement in Canada shows similar inequalities. In Ontario the kindergarten is well established. Toronto adopted the kindergarten as a part of its school system in its early years, and its example has been followed by London, Montreal, Ottawa, Hamilton, Kitchener, Peterboro, Galt and North Bay. In the other provinces the kindergartens are still largely private or charitable, and one finds only an occasional public institution. The reorganization of methods resulting from kindergarten influence, described elsewhere, has not been confined to the localities in which the kindergarten has been adopted. In helping to effect that reorganization, the kindergarten has rendered a lasting service to children in the United States and Canada.

Some Results of Kindergarten Training. In addition to its influence upon the methods of the grades, the kindergarten has exercised an influence upon the training of teachers. Before the kindergarten came, little, if any, training had been considered necessary for the teachers of the youngest children. The contrast between the work with children by those without preparation, and that of the kindergartner trained for her task, was so great that no argument concerning the importance of training for those who were to work with little children was necessary. The result of this new standard is seen in present requirements for primary teachers and in the nature of the training for primary work now very generally given in the normal schools.

Kindergarten training has done more than to show the necessity of training for work with little children, however; it has shown also what the nature of such training should be. Normal school courses have emphasized subject matter—what to teach, and how. Kindergarten training courses concentrate their attention upon the child and the needs of his progressive

development. It is with the needs of children of a specific age in mind that the kindergarten training teacher discusses the work to be done with children with her students. In consequence, the work is direct and practical, and the students' application of it in their practice teaching vital also. The value of this method of work is being recognized by normal schools, and the work of the primary course is being reshaped upon that basis.

In taking the child's progressive development as the foundation of its work, the kindergarten training school has taken a basis that gives it still another value. One of the purposes of such a study is realized when that knowledge is made the groundwork for successful work in the kindergarten. A higher purpose is realized when such a study is selected as a means to the development of womanly character in the students in training. The study of the child's development is a study of unusual interest to young women and touches springs of action in them that the usual academic subjects fail to touch. It is because young women have felt that such study had a value for their own lives that 30,000 have graduated from kindergarten training schools, and that many are now taking kindergarten courses in preference to college courses.

Value of Kindergarten Training for Mothers. It is because the kindergarten training school makes the child's development the basis of its work that it has still another value—perhaps the greatest of all. This is its value for homemaking. The kindergartner's success in dealing with children is, in fact, the strongest argument for the training of mothers. That success is often commented on by mothers who see their own children, unmanageable at home, take on the evidence of models when they enter kindergarten. The success in question is the result of the kindergartner's knowledge of children's characteristics at the kindergarten age, and of what to do with them in view of these characteristics. If mothers were to make the study of children that kindergartners make, and to make a study also of the agencies for their development—their play material and the songs and stories adapted to their stage of development—they would be much better fitted than some now are to guide the children's development and to make the home the happy place that it should be for the mother as well as for the children, if both are to be at their best.

The women who espoused the kindergarten course in the early days felt that their work for the children was incomplete unless the mothers had also been initiated into the new educational ideals. They believed that all mothers needed the new vision, not for the happiness of the children alone, but for the inspiration it would give to their own lives. That the Froebelian conception of life contributes to a mother's happiness as well as to her efficiency is the testimony of thousands of kindergarten-trained mothers.

Women's Coöperation Still Needed. The fact that the kindergarten and kindergarten training are recognized by the highest educational authorities as working along right lines and contributing to the solution of educational problems must be apparent from this brief sketch. The coöperation of women is still needed, however, if the kindergarten is to fulfil its whole purpose. The labors of the women of the early years in its behalf will stand, but their work was but a beginning that others must carry to completion. The kindergartens enrol over half a million children, but there are more than three and a half million still without the privileges it has to offer. Two million of these live in rural districts where none but home kindergartens are possible. If these children are to know the meaning of the word, they can only know it through their mothers' efforts to master its principles and apply these in their own homes. The remaining million and a half or more live in cities or towns large enough to have adopted kindergartens but that have not yet done so. Do not the mothers in these communities owe it to their own children and those of their neighbors to acquaint themselves with a movement contributing so much to educational progress and to work for its advancement? N.C.V.

Consult Vandewalker's *The Kindergarten in American Education.*

Principles of Kindergarten Procedure and Their Application

The mother who wishes to acquaint herself with the principles of kindergarten procedure will find many books to interest her. Since these principles have their origin in the conception of education as a process of development, she will gain much of the insight needed by making the child's development the basis of her study. The result of such a study, thought-

fully made, will doubtless confirm certain conclusions that she has already reached from the observation of her own children, namely, that development is an unfolding from within which follows a law of its own; that the unfolding divides itself into stages or periods, each of which has its own characteristics and makes its own contribution to the process as a whole; that if development is to be complete, the conditions for that development must be met during each period; and that if it is to be directed, the mother must have a knowledge of the whole.

These conclusions Froebel reached nearly a hundred years ago, and it was from them that he derived the idea of education as a process of directed development. He therefore set himself the task of working out the principles and methods of an education thus founded. Realizing that upon this basis much would be required of the mother, he wrote his greatest book, *The Mother Play Book,* to aid her in seeing and meeting the child's varying needs. It was because he thought that neither the home nor school adequately met the needs of children between the ages of four and six years that he devised the kindergarten and made it the embodiment of his new conception of education and the methods of carrying it out. That education is a process of development and that mothers must understand the process, in order to coöperate with nature to make it complete, was the burden of his message and one of the chief sources of his influence.

How Development Can Be Directed. Since the mother must coöperate with nature in the child's development, if that development is to be complete and directed, it is essential that she should understand the nature of the cooperation that she is to give. An illustration from the physical side is in point here. That a child's food must be adapted to his digestive power at different ages no longer needs arguing. The providing of this suitable food is the kind of coöperation needed at this point. The child has other needs also—social, intellectual and spiritual. These must be met as they arise, in the same manner, if the conditions for his complete development are to be complied with.

But the coöperation on either plane requires knowledge. The mother can only know what food is appropriate by knowing the nature of the food adapted to it. To know what intellectual or spiritual nourishment the child needs at a particular period, she needs a corresponding knowledge of his development on these planes. The mother must, therefore, be a student of childhood and an observer of her own children. By knowing the general trend of development at a given period, she can discern his needs and meet them as they arise. The evidence of a new need is found in the awakening of new interests. When he makes an effort to walk, for example, he is ready for help in that direction. Had she tried to make him walk before he showed that readiness, she would have hindered his progress instead of furthering it. This illustrates another point in the law of coöperation—that the effort to further development in any line must be based upon a knowledge of the development already attained.

These conclusions, drawn from a study of the child's development—namely, that he has varied needs which must be met if his development is to be complete; that instruction should be adapted to his comprehension; that help should be given in response to his interest; and that effective help can be given only on the basis of a knowledge of his capabilities—all these, recognized and applied at first in the kindergarten, are now being applied also in the home and in the school.

Their application in the school has already occasioned important changes in its procedure. In the past, the children were taught the "three R's" only. The introduction of drawing, music, handwork and games is a recognition of their more varied needs. In the past, they learned as best they could the things the teacher gave them. At present, she plans their work on the basis of the children's capabilities at a given period. In the past, children were assumed to have the same knowledge of right and wrong that adults have, and they were judged by the same standard. At present, parents and teachers recognize that the moral sense is a matter of development, and that they must be judged on the basis of the insight possible to their stage. As a result, children's interest in their school work is much more vital, and their conduct has a firmer basis than mere authority.

Direction of Development by Habit Formation. Thus far, development has been considered from the side of the child's needs only; but there is another side that merits attention. The child has a right to an education suited to his needs, but society has a right to demand that the standards of conduct and intelligence which civilization has built up shall be a factor in his shaping—in other words, that the child shall form habits of kindness, courtesy, truth-

fulness and self-control. Can this be done without violating the principle of adapting instruction to his comprehension? Yes, if the mother understands the principle of habit formation. She has chosen the food adapted to his need on the basis of the world's best judgment, and it is on the same principle that she has selected the pictures, stories and material that met his play needs. It is through her selection of these that she has already influenced his ideals in the direction of right standards.

The formation of habits to correspond to these ideals is effected largely through the mother's approval of the arts that are in harmony with these ideals, and the ignoring or disapproval of those of the opposite character. The repetition of the art is the result of such approval, and by frequent approvals and repetitions, the habit of action is established. The mother's approval has thus become, for the child, the selective principle by which he is led to adopt the standards of civilization.

Self-Activity as a Means of Development. That the child's development is effected by means of his activity in the form of play is another truth which the kindergarten first illustrated, and which the school has adopted. The part which the different forms of kindergarten activity play in the child's development has already been shown, and need not be repeated. The example of the kindergarten has helped to bring the value of play to the attention of educators, and has had its influence in building up the playground movement. Play is now recognized as having even greater value than Froebel attached to it—its value in building up the nervous system, the nature of which was not as clearly known in his time. That children are physically active during the early years, because nervous energy is generated faster than it can be controlled or used; and that the activity which they could not control if they would is the means by which the nervous system is developed is now generally known.

It is because play is now recognized as having a physiological function—that of developing nervous and muscular energy—that the kindergarten activities are being increasingly appreciated and that playgrounds are being generally established. It is through activity in this and other forms that children develop initiative and individuality. The help given them when they are working out their own problems is help of the most effective kind. It is in such activity that Froebel believed children to show their highest self—the self that allies them with the creative principle of the universe. The fact that schools have spent millions of dollars to provide facilities for cooking, sewing, basketry, manual training and art work in recent years shows that the public, too, is convinced of its high value.

Other Principles Which the Kindergarten Illustrates. It is because the kindergarten exemplifies so conspicuously the principle of education by development, through the medium of activity, that this aspect of its doctrine is especially associated with it in the public mind. Its whole message is not expressed in this alone, however. It is from another doctrine that a part of its influence has come—one that gives the principles named their deepest significance. This is Froebel's interpretation of humanity as spiritual in essence, and of the child's unfolding as bringing the spiritual principle within him to expression. To bring this to its fullest development in every child was, therefore, to Froebel the means of bringing into existence a higher and happier humanity. His methods were, therefore, organized with such unfolding in view. This is why he insisted on freedom, under limitation, at least, since without it the child's best self cannot come to expression. He would have the conduct or effort resulting from such freedom brought to the test of some standard, however—the conduct of a character in a story or the effort of a playmate. If the result of that comparison were favorable, he would win merited commendation; if not, the better effort of the other would become the incentive to improvement on his own part. Growth of character would be the result, because the improvement would be the result of his own will. In this way, he would become, on his own plane, a self-governing personality. This doctrine has large implications, but for these the reader is referred to Froebel himself. (See article FROEBEL, in these volumes.)

There are other phases of the kindergarten doctrines that merit discussion, but these must suffice here. It is because these principles are based upon accepted facts of the child's development that they are valid for the school and the home, as well as for the kindergarten. In consequence, their study cannot fail to give mothers a deeper insight into the problems of child-training and the methods of solving them. A wider acquaintance with these principles, as applied to the work of young children, would furnish the spur of an educated motherhood to

compel the school to do its best for them. The school has never given the youngest children their just dues. The *per capita* expenditure for the children in the high school is twice that in the grades; and of those in the grades, the youngest do not share privileges equally with the older ones. This is one of the many conditions that a larger study of the little child's education on the part of mothers could be expected to remedy. N.C.V.

Consult Blow's ***Mottoes and Commentaries of Froebel's Mother Play;*** Kirkpatrick's ***The Individual in the Making;*** Mills' ***The Mother Artist;*** Winterburn's ***Nursery Ethics;*** Harrison's ***A Study of Child Nature.***

Suggestion for Kindergarten Play in the Home

The mother who seeks help in meeting her children's play needs is often disappointed because suggestions intended to be of service contain no hint as to the age at which children can do certain things. The suggestions here made will therefore concern themselves first with the play and play material suited to children from two to four years of age, and second, with that of children from four to six years.

During the first of these periods, children's activity is primarily motor and sensory. It consists of running; climbing on chairs and couches, and down again; lifting and carrying objects from one place or room to another; and experimenting with objects, to see what can be done with them. The ideal play material, therefore, consists of sand; balls of different kinds and colors; blocks of different shapes and sizes; wooden beads of different sizes for stringing; pegboards into which pegs may be fitted in different ways; one or more medium-sized and simply-dressed dolls; and a few toy animals, such as a dog, cat, horse and cow, preferably of rubber.

During the period of from four to six years, children use these materials in different ways, and, having gained control over their hands, can use also pencils, crayons, scissors, and sewing and weaving material. The children of both ages will derive greater pleasure and profit from the materials here suggested than from the customary ready-made toys, because of their greater possibilities of experimentation and arrangement. Because of their greater durability, the cost of the former will be less, also, in the long run. Because of the frequent references that will be made to the kindergarten material, it will be well for the mother to have on hand a catalogue of kindergarten supplies. This can be obtained from the Milton Bradley Company, of Springfield, Mass.

Play Material for Children from Two to Four Years. The toys that children of two can use are necessarily simple. The colored balls of the first kindergarten gift, and the blocks—a sphere, cube and cylinder—of the second, are suited to this age (see catalogue). Children of three years will need many more blocks, however. This need can be supplied by the third kindergarten gift, which is a box of eight two-inch cubes (see catalogue). Since they will need more than this one box, it will be advisable to supplement these with a home-made set. This can be easily made from a piece of timber 2 x 4 inches, and 7 feet long. In order to have blocks of varying shapes and sizes, eight blocks 4 inches in length should be cut from this, and eight more 2 inches in length. The remainder of the stick should be cut lengthwise, and each of the resulting strips cut into 2-inch blocks. This will make fifty-two blocks in all. If these are cut true and finished smoothly, they will serve children's play purposes admirably at this period.

Children of two and a half years or more also enjoy stringing the colored wooden beads that form a part of the kindergarten material. These are made in two sizes—one inch, and one-half inch in diameter; and in three forms—spheres, cubes and cylinders. They are listed in catalogues as "Mrs. Hailman's beads," and are put up in boxes containing different numbers and sizes. For home use, one box containing a gross of the half-inch and another containing a gross of the inch size would be needed. The catalogue number of the first is 470, and of the second 470 D.

Another article much enjoyed by children of three is the pegboard—a board ten inches square, having 100 holes. With these go 100 pegs in six colors, each two inches long, to fit the holes. The catalogue number of this is 8188.

To these materials, of interest to children because of the opportunity for experimentation which they afford, must be added another—perhaps the most valuable of all, but most difficult to provide—and that is sand. The other materials can be put away when not in use, but play in sand requires a table, and this is difficult to find a place for in the ordinary

home, unless there is a special play room. If a play room cannot be provided, an effort should be made to have a sand box out of doors for summer use. The gain to children will more than compensate for the difficulty experienced in providing it.

Nature of the Child's Play from Two to Four Years. That the play of children of two and three years of age is largely experimental has already been stated. Their first play with sand, therefore, consists in piling it up into different shapes, shoveling it into a pail or box, pouring it out, and repeating the process, or making impressions of hands, blocks or other objects. It is not until they are nearly four that they attempt to represent anything, such as a garden or a yard. Their first play with blocks is of this character. They pile up the blocks into various shapes only to knock them down and build them up again. They also enjoy putting them into a basket or a small wagon and taking them to another part of the room or house, emptying them out and doing it over again. They do not, at first, represent things with blocks any more than they do with sand, but the piled-up blocks soon suggest houses or other objects, and then they attempt making them. The sand and blocks together afford unlimited opportunities for play. With these, and with a simply-dressed or rubber doll and a few toy animals, children will be happy for hours.

It is because the beads and pegboards also afford opportunities for experimentation that these give children great satisfaction. The first stringing of the beads will be mere experimenting with the colors, forms and sizes, but the fact that more satisfactory results can be obtained by stringing them in some order will eventually dawn, and further efforts will show grouping in color, form or number. It is because of their possibilities that children do not tire of them, and that they learn many facts of color, form and number.

The mother who has grasped the principle of development through activity will see that children's play with this material has high value, unorganized though it may seem. She will, therefore, see the necessity of providing a place where the children may carry it on with comfort. It is not possible for every home to have a room for play purposes only. There are few homes, however, in which a portion of the living room or the dining room cannot be set apart for the children's play uses at certain periods. It is quite possible, too, for the mother to plan a general play program for the day, the noisiest kind coming when no one will be disturbed by it, and that of a quieter type at other periods. It is essential, too, that she provide a place in which the material may be kept. One way of doing this is to make one or more play or toy boxes out of soap boxes, by lining them on the inside and covering them on the outside with a pretty cretonne. By fastening the cover on with hinges, putting castors under it and handles like trunk handles at each end, a box is provided that will contain a whole set of blocks and other material, and the children themselves can easily move it from one part of the room to another.

It should be a part of the children's education to put the play material in its proper box after it has been used, and to return the box to its accustomed place, since the formation of habits of order is essential to their happiness. In this, as in other respects, play is but a means which the mother must utilize to accomplish certain ends. The Froebelian material has possibilities that the customary toys lack, but these possibilities cannot be realized without the mother's coöperation and direction. She must, therefore, watch the children's play, and utilize the opportunities which it presents for teaching courtesy and regard for the rights of playmates or members of the family. She should note what children are able and unable to do with their bodies, their hands and the material, so as to help them take the next step forward in these several lines. She should utilize the occasions which the material affords of teaching the names of objects played with and others in the room, and the color, size, form and number of these. She should allow children to carry out their own play purposes as far as possible, however, and refrain from making suggestions until their own resources have been exhausted. It is in these and similar ways that the conditions for the children's complete development are met.

Play Material for Children from Four to Six Years. During the period from four to six years—the true play period—children begin to feel the need of companionship with others of their own age, and this need the home can but seldom supply. It is at this point that the kindergarten itself is needed. Several of the agencies which the kindergarten utilizes—the garden and nature work, stories and music—the trained mother can utilize as effectively as can the kindergartner. The essence of kindergarten play is *togetherness,* however, and the

child who misses this misses something that cannot be made up to him. The mother's direction of the child's play, with material suited to his age, is the best substitute, however, and suggestions concerning the nature of such play are therefore in order.

Because children between the ages of four and six years have acquired a certain amount of knowledge and skill through such experimentation as that described, their play is of a different character. If they use the same material, they now use it as means to an end—the carrying out of some purpose of their own. In his effort to carry out such purposes, however, the child may find that he needs a new kind of material—blocks with which he can make a sloping roof to a house.

Again he may wish to make an object out of new material—from cardboard, instead of blocks perhaps—but he does not know how. Or he finds it desirable to know how to do other things—to represent objects with pencil or scissors, or to beautify something he has made. He therefore becomes interested in new lines of work—drawing, modeling, cutting, or tearing, folding and constructing, and perhaps sewing and weaving. For his additional building he will need the enlarged fourth and fifth gifts, and, later, the sixth; and, for the handwork, pencils, crayons, or paints, blunt-pointed scissors, paper and cardboard of different kinds, sewing and weaving material—just what and how much of each will depend upon the lines attempted. Work with these materials is not so easily carried on in the home as the work with sand, blocks, or beads. Several lines, in fact—clay modeling, painting and cardboard construction—would better not be attempted, unless the mother herself has had training in these, or has provided herself with a book, such as *What and How,* since the children cannot use them successfully without careful and definite instruction.

Some of these lines of work, such as perforating, sewing on cardboard, and fine folding and weaving, are but seldom used in present-day kindergartens, because they produce nerve strain. It would be well for the home to note this suggestion and attempt only a few of the simpler lines. Children's desire to represent can be satisfied by the use of sticks, pencil and crayon drawings and free-hand cutting or tearing; and their desire for construction, by evolving some of the simpler forms from cardboard foldings or from the utilizing of empty spool boxes. Assuming that the mother will wish to attempt some work in several of these lines, the following material is suggested:

Seventh gift pasteboard tablets, one box of 100, form A, B, G.

Eighth gift sticks, one box enlarged, uncolored sticks, 1 inch in length, and one each of 2 inches, 4 inches and 6 inches in length; numbers 40, 41, 43 and 45.

Weaving mats, linen, 1 dozen ½ inch slits, No. 1231, and 1 weaving needle, No. 396.

Sewing cards, Miss Stodder's, 1 dozen, design to be selected, silkateen, 1 dozen spools, No. 195A, and needles, 1 paper, No. 199.

Crayons, one box kindergarten crayons, or Embeco crayons, No. 8100.

Paper for drawing, folding or cutting; one ream No. 20 manila, 6 x 9 or 9 x 12 in. White shelf paper can be substituted for this, or the paper that can be purchased of any printer, cut to the desired size.

Paper for cardboard construction—Bradley's Bull's Eye paper, one package, 50 sheets, assorted colors.

A blackboard.

A set of Bradley's Straight Line Picture Cut-outs, No. 8216.

Suggestions for Work with the Material Named. Children's first attempts at free representation by drawing, modeling, painting, cutting, etc., are as crude as their first efforts with sand and blocks. They will, therefore, need the stimulus of their mother's suggestion and encouragement to continue until their work is good. It will therefore be best to have them continue their play with the known material, making this more difficult, and to take up one or two of the new lines only at first—crayon drawing and paper cutting, perhaps—and introduce the others gradually. In the block building, definite problems may be set, such as the building of a house with a definite floor space, a special kind of roof or a certain number of windows. The pegs and beads may now be used in certain number combinations, or the stringing may be of corn and seeds, and with a thread and needle, instead of shoe laces.

The best start in drawing, cutting or tearing will be made by the child's seeing his mother draw, cut or tear a simple object. Suggestions for carrying these on are given in the illustrations. To sustain the interest in such work, it is well for the mother to help the child make a book, either from cloth or construction paper, in which to mount his best drawings and cuttings. These may include some pictures of fruit, or other objects cut from seed catalogues. The illustrations may suggest the uses and cover decorations of several such books. The children may keep these for their own pleasure, or use them for gifts to friends. In either case,

they serve to organize the children's efforts, and make each day's work contribute toward an end they are carrying out. It is the having such an end that makes their work vital.

It is because children's play and work must have a relation to their own purposes, if it is to contribute to their real development, that the making and furnishing of a doll house is made much of in present-day kindergartens. Its value there is limited, however, because each child's part in the whole is so small. Because the child at home can have the main share in its making, a doll house made from a hat box or soap box should form a part of every child's play equipment. When the mat that he weaves is to be used as a rug, or the cardboard is to become the furniture, these objects and his work with them assume an interest which they did not have before. The boy who has built a barn and sheds in which to shelter his toy animals acquires an interest in these that will carry him forward to new things.

The Value of Home Play Depends Upon Parents' Attitude. The parents' attitude toward such play as this suggested will in a large measure determine its value for the children. If they regard it as a means to the child's development they will take pains to see that it is of the kind to develop resourcefulness and the habits of orderliness and consideration for the rights of others. They must be willing to let children form and carry out their own play projects, and refrain from overwhelming them with suggestions. One of the most important lessons for children to learn, however, is coöperation with others, on the basis of mutual rights. They must not, therefore, be allowed to usurp authority. Parents often fail to respect children's rights, but children as often fail to recognize that parents have rights also. The right to suitable play material and a place in which to use it is a right that should be conceded to children; but they should be taught from the beginning that the parents' rights may prevent the children's exercise of their own sometimes.

Parents should resist the temptations to buy expensive toys, since these defeat the purpose of education through activity, which is the development of resourcefulness and the enjoyment of simple, wholesome things. The holidays that give the children the greatest pleasure are those to which they contribute the most. A Christmas tree that contains decorations and gifts of the children's own making to the friends of their own choosing, will afford greater happiness than one that dazzles them with its glitter and overwhelms them with toys of which they can make no use.

It is in this spirit and to these ends that parents should direct their children's play. The play with material forms but one of several agencies that contribute to their unfolding. Of the games that children enjoy so much in kindergarten, only the sense games, hiding games and guessing games can be used in the home, since the essence of the others lies in the companionship of other children. In the absence of such companionship, the parents must contribute more of their own. By participating in their children's unfolding, the parents will themselves be the gainers, since the enriching of their children's lives will result in the enriching of their own. N.C.V.

Consult Smith's *The Home-Made Kindergarten;* Palen and Henderson's *What and How;* Burnham's *Rhymes for Little Hands;* Poulsson's *Father and Baby Plays;* Lindsay's *Mother Stories* and *A Story Garden for Children.*

Related Subjects. The following articles in these volumes contain material which will be helpful in connection with the above discussion of the kindergarten:

Baby	Habit
Child	Montessori Method
Child Study	Nature Study
Dolls, Paper	Play
Education	School Gardens
Froebel, Friedrich	Schools
Games and Plays	Story-Telling
Gardening	Toys

KINEMATICS, *kin e mat'iks,* the branch of mechanics that deals with pure motion apart from all causes. To the idea of space and the movement of a point in space, employed in geometry, kinematics adds the idea of time; that is, displacement at a definite speed in a definite direction. The mass of the moving body and the forces that set it moving do not enter into consideration. See FALLING BODIES; DYNAMICS.

KINETOGRAPH, *ki ne'toh graf,* and **KINETOSCOPE,** *ki ne'toh skohp,* the names originally given by their inventor, Thomas A. Edison, to the respective machines for taking and for exhibiting moving pictures. In America they are now commonly called the *camera* and the *projector.* See MOVING PICTURE.

KING, a reigning sovereign who holds his position by life tenure and hereditary succession. There are degrees of dignity in titles of rulers, a king being in importance below an emperor; the latter is at the head of a monarchy composed of a strong federation of

states, while the former rules over a single country of relatively small extent. The world has woven much of romance around the name and office of king. In medieval days the king was acknowledged the earthly representative of God, and "the king can do no wrong" was commonly accepted and believed. The word is a figure of speech for splendor, vast power and regal authority, but the modern king is a constitutional monarch, whose privileges and duties are as sharply defined as is the conduct of his subjects. See QUEEN; RULERS OF THE WORLD.

KING, CLARENCE (1842-1901), an American geologist whose surveys and investigations in the West have made valuable additions to the science of geology. In this work he aided materially in the development of the mining industry in the United States. After his graduation from the Sheffield Scientific School at Yale, he spent several years in the exploration of California, making the first survey of the Yosemite Valley and discovering and naming mounts Whitney and Tyndall. Placed in charge of the United States geological exploration of the fortieth parallel in 1867, he gave five years to this work and thereby laid the foundations for future geological investigations for the government. When, in 1879, the geological surveys acting under the government were organized under one head, King was made first director of the department. Among his writings are *The Age of the Earth* and *Systematic Geology.*

KING, WILLIAM LYON MACKENZIE (1874-), a Canadian economist and statesman, a grandson of William Lyon Mackenzie. He is noted for his studies and investigations in problems of labor, and for his skill in the settlement of industrial disputes. King was born at Berlin (now Kitchener), Ont., and was graduated from the University of Toronto in 1895. Between that year and 1900 he was in turn a newspaper writer, a student at the University of Chicago, a special Dominion commissioner to investigate the carrying out of government clothing contracts in Europe, and then an instructor at Harvard University, where he also pursued advanced studies for which he was given the degree of Doctor of Philosophy.

In 1900 he was appointed Dominion Deputy Minister of Labor and editor of the *Labor Gazette,* and in the next few years was repeatedly called on to act as conciliator in industrial strikes. In 1908 King was elected as a Liberal to the House of Commons, and a year later, when the Ministry of Labor became a separate department, was appointed its first Minister. He held this position until 1911, when he resigned with the Laurier government and was defeated for reëlection to the Commons. In 1914 the Rockefeller Foundation (which see) appointed him to conduct extensive researches into the relations between capital and labor.

KING, WILLIAM RUFUS (1786-1853), an American statesman and thirteenth Vice-President of the United States. He was born in Sampson County, N. C., and was educated at the state university; later he studied law and in 1806 was admitted to practice. The same year he was elected to the state legislature, and in 1810 to the national House of Representatives. In 1816 he became secretary of the United States legation in Naples and afterward went to Russia in the same capacity.

After his return from Europe in 1818 King settled in Dallas County, Ala., as a cotton planter, and was a member of the convention which framed the state constitution. In 1844 he was appointed minister to France. England was then opposing the proposed annexation of Texas, and thought France would join in the protest, but the American minister secured Louis Philippe's promise not to offer objection, and Texas was accordingly annexed without further opposition. King was elected Vice-President of the United States in 1852 on the Democratic ticket headed by Franklin Pierce.

KING'BIRD, an interesting, drab-colored bird of the flycatcher family, of great assistance to the agriculturist. It has a slate-gray back, white under parts and a patch of bright red feathers on the top of its head, which it raises as a crest when angry, but otherwise conceals. It is less than nine inches long. The kingbird, which frequents almost all parts of the North American continent and sections of South America, derives its name from the despotic authority it assumes at certain seasons over other birds, for it attacks them furiously as they fly and forces them to divert their course.

KINGBIRD AND NEST

However, only in the breeding season does the kingbird act so rudely, and love for its mate and its young prompts such deportment. The nest, made of grass and weeds, is frequently placed in fruit trees. In it are laid three or four eggs, which are pinkish, spotted with brown. This bird has keen sight and is ever on a sharp lookout for insects, which it catches while it is on the wing. Because of fondness for bees it is also called *bee martin.*

KING'FISHER, a family of birds whose distinguishing characteristics are large heads and backward-turning crests, long, pointed bills, short, stubby tails and short legs. Strong membranes unite the outer and middle toes. The brilliant colors and fish-eating habits of the birds suggested the name.

THE KINGFISHER

In the large kingfisher family there are two subfamilies, the *kinghunters* and the true *kingfishers.* Birds of the first group are found in Europe, Africa and Asia. In appearance they are much like true kingfishers, but differ in habits. They live in woods, often very far from streams, and eat insects and reptiles rather than fish. The second group includes the brilliant little European kingfisher and six American species. Kingfishers are found throughout North America. In the summer time they range from the Arctic Ocean to the Gulf of Mexico and from the Atlantic to the Pacific. In winter they migrate south of the frost belt.

The best-known and most widely-distributed American species, the *belted kingfisher,* is twelve or thirteen inches from the tip of the bill to the end of the tail. The color above is deep blue, or bluish-gray marked with white; the underparts are white. A broad collar of blue crosses the breast, and the female has besides lines of chestnut-brown which extend along the sides. Anglers may depend upon these birds to know where the fish are plentiful. They spend long hours sitting upon branches which extend over a stream, and dashing into the water after small fish that pass their way. They carry the fish back to their branch, knock it soundly to kill it, then toss it into the air, catching it as it comes down. If the kingfishers are disturbed they fly off, piercing the air with their harsh, rattling notes.

Kingfishers dig their nest in the perpendicular walls of clay or sand banks above the high-water mark. The opening is just large enough for one bird. The tunnel is from four to ten feet in length, and is enlarged at the farther end, where they make a nest for the six or eight pure white eggs. Both male and female sit on the eggs, and the little birds hatch in about sixteen days.

The kingfisher has been identified with the halcyon of ancient fable, which was said to lay its eggs in a nest that floated out to sea. See HALCYON.

KING GEORGE'S WAR. See FRENCH AND INDIAN WARS.

KING'LET, a family of dainty little olive-green birds that flit about rapidly among the leaves and twigs in search of insects. Two species, the *ruby-crowned* and the *golden-crowned,* are found in North America, many of the golden-crowned being so rugged that they never fly south in search of a warm climate during the winter. Both birds have gray breasts and short, dusky tails, edged in olive-green like their backs, but their distinguishing feature is their bright crest, the color of which is indicated by their name.

The ruby-crowned kinglet is fond of warm weather, so in October it flies to Central

THE KINGLET

America and Mexico, but returns in the spring to the Northern United States and Canada, filling the air, while on the way, with a rich, lyrical song. Both birds frequent the pine trees, building their hanging, cup-shaped nests of moss, grass and feathers near the tip end of branches. These nests may seem large for the tiny bird, which is only a little over four inches in length, but from six to nine creamy white eggs, with small brown dots, are laid in this cradle, and there must be room for the baby birds.

KING PHILIP (? -1676), a famous Indian chief connected with early American history, whose real name was *Metacomet*. He was the son of Massasoit, friend of the white colonists and ruler of the Wampanoags, a tribe living in what is now Southeastern Rhode Island. Philip is famous as the chief character in the most severe Indian war in which the English colonists were ever engaged. Like his father, Philip had long been friendly to the whites, but believing that their occupancy of the country would result in the destruction of his own people, he joined with the latter when they rose against the colonists. This outbreak, known as King Philip's War, was marked by massacres and widespread destruction. The superior forces of the English gradually weakened the power of the Indians, who were finally entirely subdued. Philip fled to his old home near Mount Hope, R. I., where on August 12, 1676, he was hunted down and killed by a searching party.

KINGS, Books of, two books of the Old Testament, in which the political history of the kingdoms of Israel and Judah is related from the close of David's reign to the fall of Jerusalem and the captivity in Babylon. The life of the two kingdoms was closely interwoven up to the capture of Israel, for both countries had a constant conflict within themselves over the worship of God and Baal. However, Judah was led by the faithful kings, Asa, Hezekiah and Josiah, so it existed for 130 years after the fall of its neighbor. Although the authorship of the books is uncertain, they cover about the same period of 400 years described in the two books of *Chronicles*, and were probably written by the prophets or priests, being later collected into the one book by Jeremiah or Ezra. See Chronicles, Books of.

KINGSFORD, William (1819-1898), a Canadian engineer and historian, whose *History of Canada* is still a standard work. In the preparation of this great book, in ten volumes, he spent seventeen years in a faithful study of the Canadian archives, and then devoted the last ten years of his life to writing it. It is an accurate, straightforward account of the story of Canada. Until the appearance of this monumental history Kingsford was known as an engineer and author of books on Canadian canals and railroads. He was of English birth, but went to Canada in 1837 as a soldier. In 1841 he left the army to go into the city surveyor's office in Montreal. Thereafter he was employed in the survey of the Lachine Canal, in the construction of railways in New York State and Panama, in the survey of the Grand Trunk Railway, and finally, from 1872 to 1879, was Dominion engineer in charge of the Saint Lawrence River and the harbors on the Great Lakes. G.H.L.

KINGSLEY, *kingz'li,* **Charles** (1819-1875), an English novelist and clergyman, best known as the author of *Westward Ho!*—a stirring, vivid tale of English naval and commercial glory in the days of Queen Elizabeth. Of almost equal dramatic interest are two other historical novels, *Hereward the Wake,* the events of which take place during the reign of William the Conqueror, and *Hypatia,* the story of Christianity in conflict with the declining philosophy of Greece in the fifth century. Kingsley was born June 12, 1819, was educated at Magdalen College, Cambridge University, and after his graduation in 1842 became a curate of the parish of Eversley, in Hampshire. Two years later he became its rector. He soon began to devote himself to the welfare of the working classes, revealing his genuine sympathy for the poor in his first novel, *Alton Locke* (1849), the hero of which is a London tailor. In *Yeast, a Problem,* which soon followed, he pointed out the conditions of the English farm laborers.

CHARLES KINGSLEY

Kingsley was appointed professor of modern history at Cambridge in 1860; in 1869 he was made canon of Chester and later canon of Westminster. He was one of the most effective preachers of the day, and his best pulpit discourses have been published under the title *Twenty-five Village Sermons.* In 1874 he visited the United States, delivering while there a course of lectures.

Kingsley was also the author of several poems and of a charming fairy tale for children, entitled *The Water Babies.* This beautiful story, which was written originally for the entertainment and instruction of one of

the author's own children, relates the adventures of an ill-used little chimney-sweep named Tom. Having plunged one day into the cool waters of a meadow stream, to cleanse his sooty little body, he was drowned. At least that is what the people believed, for they found his body in the water and buried it, not knowing that he had been changed by the fairies into a little swimming creature about four inches long—a true water baby.

KINGSTON, *kings'tun,* the county town of Frontenac County, Ontario, at the eastern end of Lake Ontario, where waters of the Great Lakes enter the Saint Lawrence River. It is also at the mouth of the Cataraqui River, and is the southern terminus of the Rideau Canal (which see). The position of Kingston at the entrance to the Saint Lawrence makes it a point of call for all steamers on this route, and brings it a large trade, particularly in the transshipment of grains. The harbor is large, and is sheltered by two islands, Wolfe and Simcoe. In addition to the facilities for water transportation, Kingston is served by three great trunk lines of railway, the Canadian Pacific, the Canadian Northern and the Grand Trunk; by the shortest rail routes it is 163 miles northeast of Toronto and 117 miles southwest of Montreal. Population in 1911, 18,874; in 1916, about 21,000.

Kingston's industries are of great importance, including boat-building and the manufacture of locomotives and railway rolling stock, cotton and woolen goods, leather, pianos and tiles. The annual value of the manufactures is nearly $5,000,000. The public buildings, all of stone, are a striking feature of the city, and also noteworthy are the Anglican and Roman Catholic cathedrals, several hospitals, a Dominion penitentiary and the Rockwood asylum for lunatics. Chief among the educational institutions is Queen's University (which see). The Royal Military College of Canada, founded in 1886, is here, as are also the School of Mining and the Eastern Dairy School. The proximity of the famous Thousand Islands (which see) has made Kingston a resort for summer visitors.

KINGSTON, an important city of the tropical West Indies, the capital and principal port of Jamaica. It is in one of the greatest banana-producing regions of the world and is an important port of call for steamships *en route* from New York City to the Panama Canal. The city is situated in the southeastern part of the island, on one of the best of small land-locked harbors. Kingston was founded in 1693, the year after the older town of Port Royal was carried into the sea by an earthquake. Old Port Royal, located on the end of the arm of land locking the harbor, was long the rendezvous for pirates and outlaws, and was said to be "the wickedest spot in the world." Kingston has been visited by earthquakes and fires, but each time has been rebuilt. It is now a beautiful, modern city in which are located the British government offices. It is also the railroad center for the island of Jamaica and carries on a thriving import and export trade. Population, 1911, 57,379. See JAMAICA.

KINGSTON, N. Y., the county seat of Ulster County and a city of historical interest, dating from colonial days. It is situated in the southeastern part of the state, on the Hudson River, which at this point receives the waters of the Rondout River. Albany is fifty-five miles north, Poughkeepsie is fifteen miles south and New York is eighty-eight miles south. Transportation is provided by the West Shore and the New York, Ontario & Western railways, by the Walkill Valley Railroad, which connects with the Erie Railway, and by the Ulster & Delaware, connecting with the Delaware & Hudson Railroad. Connection with all stopping points on the Hudson River is made by steamboats. The population was 25,908 in 1910; it was 26,711 in 1916 (Federal estimate). The area is little less than seven square miles.

Owing to its excellent shipping facilities, Kingston is the center for a large trade in coal, building and paving stone, brick, lime, cement, lumber, grain and farm products. There are extensive railroad shops, steamboat plants, lace mills, automobile plants, foundries and cigar and shirt factories. The city has a Federal building, a city hall, a $325,000 high school, erected in 1914, Kingston and Ulster academies, a business college, a Carnegie Library and four hospitals. Features of interest are the Old Senate House, the Centennial House and Ulster County courthouse.

The first settlement was made by the Dutch in 1652; it was then called Esopus, for the Esopus Indians. In 1661 it was chartered as a dependency of Fort Orange (now Albany) and called Wiltwyck. In 1667 the British took possession of it, and in 1669 the name was changed to Kingston by the first English governor, Lovelace, in honor of his family seat "Kingston," in England. In the Senate House

(built in 1676), the first senate of the Empire State gathered in February, 1777, and the first state constitution was proclaimed in front of the courthouse in the following April. Chief Justice Jay opened the first state court in Kingston in September of the same year. In October, 1777, the British under General Vaughn destroyed the town by fire, the only building saved being the Centennial House. Kingston was incorporated as a village in 1805, and in 1872, when the villages of Rondout and Wilbur were annexed, it received a city charter. J.E.C.

KING WILLIAM'S WAR. See FRENCH AND INDIAN WARS.

KIOWA, *ki'o wa,* a tribe of North American Indians, whose range was formerly along the Arkansas and Canadian rivers in Indian Territory (now Oklahoma), Colorado and New Mexico. They were very hostile to the whites, and made repeated attacks on the settlers in Western Texas until, in 1868, they were confined on a reservation in the present Oklahoma. In 1874 they became troublesome again, but in the following year were fully subdued. According to a treaty made in 1901, the surviving Kiowas, who number about 1,100, are in law American citizens.

KIP'LING, [JOSEPH] RUDYARD (1865-), an English short-story writer, novelist and poet, who achieved world-wide fame in the latter part of the nineteenth century as one of the most original and forceful writers of the age. His writings are a revelation of abounding vitality of narrative, variety of character, inventiveness and power to convey to the reader the magic spell and atmosphere of far-away lands. He is a master of the short story and a poet whose vigorous and unconventional verse is like that of no other writer.

RUDYARD KIPLING

Kipling was born on December 30, 1865, in Bombay, India, the country which he has pictured in all its variety, its mystery and its strange beauty. His father, who was for several years connected with the art schools at Bombay and Lahore, sent him to England when he was five years of age. In 1879 Rudyard entered the United Services College at Westward Ho, Devonshire, enjoying there a series of schoolboy adventures which he afterward reproduced in the breezy stories published under the name *Stalky & Co.* (1899). At the age of seventeen he returned to India and joined the editorial staff of the Lahore *Civil and Military Gazette.* In this journal appeared some of his earliest verse and sketches of Anglo-Indian life. From 1887 to 1889 he was assistant editor of the Allahabad *Pioneer,* and during this period published several of his best-known narratives, including *Soldiers Three, The Phantom Rickshaw and Other Tales* and *Wee Willie Winkie and Other Child Stories.*

In 1892 Kipling married the daughter of H. Wolcott Balestier of New York, and for a few years thereafter made his home in Brattleboro, Vt. His fame as a writer of fiction was already secure, but he won new laurels through his spirited verses in the slang language of the soldier, published in 1892 in book form under the title *Barrack Room Ballads.* Two *Jungle Books,* those fascinating beast stories whose scenes are laid in the wilds of India, appeared in 1894 and 1895 to delight a host of readers, old and young. Two years later Kipling wrote his noblest poem, *The Recessional,* in honor of Queen Victoria's diamond jubilee. The opening stanzas of this majestic song could appropriately be called a prayer for all nations:

God of our fathers, known of old—
Lord of our far-flung battle-line—
Beneath whose awful Hand we hold
Dominion over palm and pine—
Lord God of Hosts, be with us yet,
Lest we forget, lest we forget!

The tumult and the shouting dies—
The captains and the kings depart—
Still stands Thine ancient sacrifice,
An humble and a contrite heart.
Lord God of Hosts, be with us yet,
Lest we fofget, lest we forget!

The most notable of Kipling's longer narratives, *Kim,* appeared in 1901. This marvelous panorama of life in India was followed the next year by *The Just-So Stories,* a book for children. In 1907 the author visited the Canadian Northwest, where he received a most enthusiastic welcome, and the same year he was awarded the Nobel prize for literature (see NOBEL PRIZES). Among his later writings are *Traffics and Discoveries, Puck of Pook's Hill, Actions and Reactions, Rewards and Fairies, A History of England* (written with C. R. L. Fletcher) and *The Harbor Watch* (a play). Kipling has taken an active interest

in modern British political questions, his enthusiasm for the principles of imperialism being matched by his opposition to Home Rule for Ireland. During the War of the Nations a number of articles written in his brilliant and interesting style, and giving his personal impressions of scenes in the war zone, were published. C.W.K.

Consult Hopkins' *Rudyard Kipling: A Survey of His Literary Art.* A valuable work for the reader of Kipling is Young's *Dictionary of the Characters and Scenes in the Stories and Poems of Rudyard Kipling.*

KIR'BY, WILLIAM (1817-1906), a Canadian novelist and poet, author of *The Golden Dog,* regarded as the best historical novel yet written by a Canadian. The tale takes its name from a tablet, on a building in Quebec, on which is shown a dog gnawing the thigh bone of a man; it deals with the struggle of the French to hold Canada against the British. Besides a number of other prose works, Kirby wrote *U. E.,* an epic poem dealing with the United Empire Loyalists, and *Canadian Idylls,* a volume of poems. Kirby was born at Kingston-upon-Hull, England, went to Canada as a boy of fifteen, and with his parents settled at Niagara, Ont. There he was from 1839 to 1859 editor of the *Niagara Mail* and from 1871 to 1895 collector of customs. G.H.L.

KIRGHIZ, *kir geez',* a group of wandering tribes who inhabit the plains and marshes between the borders of European Russia and those of Western China, northward beyond the Syr-Darya River. They possess Mongolian features and Tartar speech, and are subject to Russia. They live in tents, keep cattle, horses, camels, goats and fat-tailed sheep, and raise wheat, barley and millet. Manufacturing among them is limited to handwork in metals and the weaving of wools, and trade is carried on by barter. Their number is estimated to be 3,000,000.

KISHINEV, *ke she nyawf',* a town of Southwestern Russia, the center and capital of the rich agricultural province of Bessarabia. It lies on the Byk River, a branch of the Dniester, eighty-six miles northwest of Odessa, and on a railway connecting Odessa and Jassy, in Rumania. The place is divided into two parts —the old town, with its shabby buildings and unpaved streets, and the new, built on high crags above the river; in the suburbs are fertile gardens which yield great quantities of fruits. Kishinev is the residence of a bishop, and has a number of educational institutions. Among the decorative features are monuments erected to Czar Alexander II and the poet Pushkin. Industrially the town is known for its production of tobacco, tallow, grain, wool, soap and flour. Its history dates from the fifteenth century. In 1903 and again in 1905 there occurred in the city terrible massacres of the Jews. Population, 1912, 125,876.

KITCHEN CABINET, a nickname in American political history. It was applied to a group of men who, during the Presidency of Andrew Jackson, although they held no important government offices, exercised a greater influence over the policy of the administration than did the members of the Cabinet themselves. The most influential of these unofficial advisers were Major William B. Lewis, second auditor of the treasury; Isaac Hill, editor of the *New Hampshire Patriot;* Amos Kendall, fourth auditor of the treasury; Duff Green, editor of the *United States Telegraph* (Washington, D. C.), and Francis P. Blair, editor of the Washington *Globe.*

KITCH'ENER, until 1916 known as BERLIN, is the county town of Waterloo County, Ontario, sixty-three miles west of Toronto and thirty-five miles west of Hamilton. Galt and Guelph are each fourteen miles distant, the former to the southeast, the latter to the northeast. Kitchener is on the Grand Trunk Railway, and an electric line furnishes connection with the Canadian Pacific at Galt. The vicinity of Kitchener is a famous agricultural section, but the town itself is a manufacturing center, with a total annual output valued at $10,000,000. Furniture, shirts and collars, rubber goods, leather, buttons, boots and shoes, trunks, clocks and gasoline engines are among the principal products. Kitchener is the seat of Saint Jerome's College, a Roman Catholic institution founded in 1865. The town owns and operates its street railway, electric light and gas plants and waterworks. A large part of the population of the town and the surrounding country is of German birth or descent. This fact caused considerable comment at the beginning of the War of the Nations in 1914. Finally, in 1916, the name was changed from Berlin, which it had been since its foundation, to Kitchener, in honor of the great British military leader. The change was made voluntarily as evidence of the people's loyalty to Canada and the British Empire. Population in 1911, 15,196; in 1916, about 19,000.

KITCHENER, HORATIO HERBERT, Earl Kitchener of Khartum (1850-1916), familiarly known

as "Kitchener of Khartum," was Great Britain's great military genius of the late nineteenth and early twentieth centuries. He left the impress of his organizing ability upon almost every part of the empire, won highest honors as a leader of its armies, and died at the height of his career, just after the greatest work of his life had been skilfully accomplished.

LORD KITCHENER

Kitchener was born June 24, 1850, at Ballylongford, County Kerry, Ireland, where his father, Lieut.-Col. Henry Horatio Kitchener, was on military duty at the time; his mother was Anne Frances Chevallier, daughter of an English preacher. His education was secured at the Royal Military Academy at Woolwich, and at the age of twenty-one he began a career which grew in brilliance with the passing years. The activities of the man may thus be summarized:

He was appointed a lieutenant in the engineer corps, 1871, and reached a lieutenant-generalship in 1902, through the following service: appointment on a survey in Palestine, 1874-1878; on a survey in Cyprus, 1878-1882; in command of cavalry in Egypt, 1882-1884; on the Nile expedition, 1884-1885; governor of Suakim, 1886-1888; with expedition on Soudan frontier, 1889; adjutant-general Egyptian army, 1888-1892; commanded Dongola expedition, 1896, then reaching the grade of major-general; commanded the Khartum expedition, 1898; chief-of-staff of forces in South Africa, 1899-1900; commander-in-chief in South Africa, 1900-1902, with rank of lieutenant-general; commander-in-chief in India, 1902-1909; member of committee of imperial defense, 1910; Secretary of State for War, 1914.

After his brilliant work in the Khartum expedition he was raised to the peerage as Baron Kitchener, given a grant of $150,000 and service medals. At the conclusion of the South African War, where he had seen his country safely through a campaign badly begun, Parliament gave him the nation's thanks and a grant of $250,000; in 1914 he was created Earl of Khartum and Broome.

Upon the entrance of Great Britain into the War of the Nations in 1914 Kitchener was universally acclaimed as Britain's main reliance in the heavy task of raising an army. He was placed in the Cabinet with the rank of Secretary of State for War, and was given dictatorial powers. Within ninety days there were under arms 1,300,000 men, and as many more were asked for before the end of 1914. "Kitchener's army," it was called, and it took its place on the firing lines in France as fast as its units could be prepared. By the early spring of 1916 over 4,000,000 men, gathered from all parts of the empire, had answered the call to arms.

On June 5, 1916, when Earl Kitchener and his staff were *en route* to Russia on business connected with the war, their vessel was sunk either by a mine or by a torpedo, not far from the Orkney Islands. Nothing was ever heard of the Earl thereafter, and he was undoubtedly drowned. Some extravagant reports claimed, however, that a German submarine had rescued him and that he was held secretly a prisoner in Germany.

He was a silent, forceful man, a deep thinker and a strict disciplinarian. His critics termed him cold and heartless. Trained in the stern business of war and having learned the necessity of implicit obedience, he exacted rigid formalities from subordinates with a bluntness which sometimes seemed unnecessarily severe. But he accomplished well those tasks intrusted to his charge and died while English public sentiment in his favor was at high tide. See WAR OF THE NATIONS. E.D.F.

Consult Steevers' *With Kitchener to Khartum;* Wheeler's *Life of Lord Kitchener.*

KITCHEN MIDDENS, mounds of shells and refuse found in many places in the world, formed by throwing together the refuse of a camp or village inhabited by ancient peoples. The largest of these mounds was discovered in Denmark, and from the Danish name given it we derive the term *kitchen middens.* The mounds contain large quantities of stone and bone tools, shells of shellfish used for food, fragments of pottery, and the bones of wild animals and of dogs. Kitchen middens are found all along the Atlantic coast of North America, from the Gulf of Saint Lawrence to Florida and along the Pacific coast to the Aleutian Islands. The objects found in these mounds give a good idea of the habits and customs of an ancient people who lived in America centuries before the coming of the white man. In Europe they bear evidence of a race living there before historic times.

KITE. Just who invented this device of paper and light wooden framework which soars in the air like a big, strong bird, and so is

called by the English a *kite,* is unknown. But it is certain that it has existed for a very long time. The first thought on hearing the word is of the kites which boys use as toys, "kite season" in many localities coming with the first winds of spring and lasting all through the summer. It is not only as a toy, however, that the kite is used. The paragraphs immediately below will give some interesting information as to how kites have been of value to scientific men.

The Useful Kite. Perhaps the most famous use of a kite for a scientific purpose was that of Benjamin Franklin, but he was not the first thus to use it. Three years earlier Alexander Wilson, an astronomer of Edinburgh, fastened thermometers to kites and sent them far aloft, to record the temperature of the clouds. Then, in 1752, came Franklin, who

> Brought electricity out of the sky
> With a kite and a string and a key;

and from his time more and more use has been made of the kite in science. Instruments to measure wind velocities and thermometers innumerable have been sent up, and in 1898 the United States established daily kite ascensions in seventeen weather bureaus. Ascensions to heights of almost five miles have been made, and much has been learned in this way as to the conditions of the upper air.

The engineer, too, often finds the kite of value. If he has to throw a line across a chasm he first floats a kite across; then with the aid of the light kite string he draws over a strong cord, and, finally, the heavy cable. This was the method employed in the beginning of the construction of the great suspension bridge at Niagara Falls. In advertising, too, kites have played a part, and frequently over crowded streets or a large outdoor assemblage they are to be seen floating, with banners hanging from them bearing political or advertising notices.

For military purposes kites have been used for signaling, and by the addition of lights have been made to do duty by night as well as by day. A special kite-balloon, too, has been invented, which is strong enough to hold a passenger car at a height of several hundred yards above the earth and which has an advantage over the spherical balloon, in that the wind does not force it downward.

How to Make a Kite

This is one of the first things that the average boy wants to make, and in its simpler forms it is easy to construct. The commonest form is made of two sticks of different lengths placed in the shape of a cross, with the shorter one above the center of the long one. From arm to arm, all around this framework, is stretched a stout string, and over the whole is pasted a lightweight paper—newspaper will do, but a stout tissue paper is more attractive. Strings, rather slack, follow the line of the framework, and where these cross is fastened a long string by which the kite is held when it floats far aloft. To the very bottommost point is fastened a "tail" of rags or bits of paper, for the kite needs this weight to "steady" it and keep it from "diving." The length of the tail, from six to twelve feet, is determined by the weight of the kite and the wind velocity. Here is

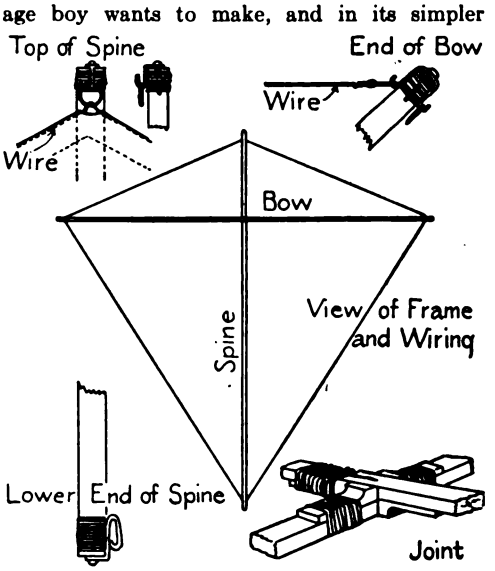
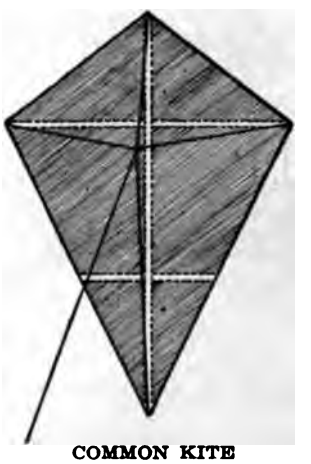


DIAGRAM OF KITE FRAME
If a kite is constructed according to this plan, it will be strong and durable.



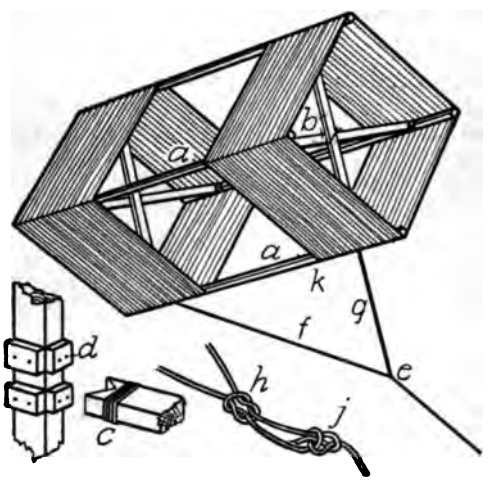
COMMON KITE
Framework and cover; tail not yet attached.

shown a picture of this simplest of all kites, but it will be noticed that a variation is introduced. A third stick, shorter than either of the others, has been added; any boy can easily show that this will improve not only the wearing qualities but the flying power of his kite.

A Box Kite. The ingenious boy is not going to be satisfied long with anything so simple as a common kite, especially if he has seen some playmate flying a box kite. This form is not at all difficult to make if the directions and the design as shown are carefully observed:

Choose four sticks of straight-grained wood, such as white pine, spruce or basswood, having them about forty-two inches long and three-eighths inch square. Fasten them together as shown in the illustration by means of four braces twenty-six inches long and one-half inch by one-quarter inch in cross section. The joining should be by means of notching, as shown in the illustration, and the joints should be thoroughly wrapped with thread or with fine wire, to prevent slipping.

Next take two bands of cambric, or some such firm, light-weight cloth, twelve inches wide and seventy-four inches long, and fasten them

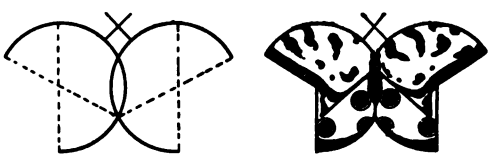


A BOX KITE

(*a*) Frame, with (*b*) crosspiece; (*c, d*) details of joints; (*e*) string joined to bridle; (*f, g*) bridle; (*h, j*) knots.

about the long sticks with small tacks. If the bands are hemmed on their long edges the kite will be stronger. Be sure, in putting on the cloth, that it is drawn so tight that the diagonal braces are curved very slightly, for only so can the cloth be held firm and taut. Next attach the bridle, or guiding ropes, as shown in the design, and the kite is ready for flying. If, however, there is a very high wind, it is safer not to use a bridle, but to fasten the string to the center of one of the long sticks.

The Butterfly Kite. This is an especially pretty kite, and a fairly easy one to make. Take two long, thin sticks of equal length, and bend each into an arc, an shown in the illustration. To one end of each stick tie a



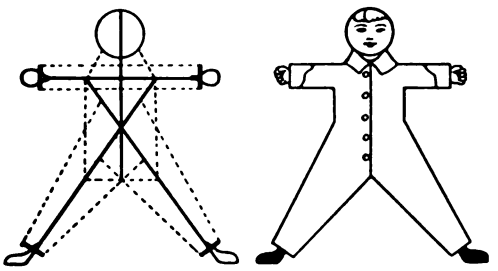
BUTTERFLY KITE
Framework and covering only are shown.

strong string, fastening the other end of the string to a point about three inches from the other end of the stick. Now tie a string to the free end of each stick, and attach the other end of the string to a point three inches from the opposite arc. Place one stick over the other, to make sure that they are just the same shape and that the strings cross and are tied at just the same points. With strong thread fasten the sticks together in the position shown in the illustration, taking care that they overlap somewhat. The "feelers," without which it would not seem like a real butterfly, may be made of two pieces of wire or straw, fastened to the sticks not far from their intersection, and crossed. The kite is now ready for the paper, and the brighter the latter is in color, the better. Yellow makes a particularly pretty butterfly. Lay the frame on the paper and cut around it, allowing at least a half-inch margin to be turned over for pasting. It will be necessary to cut this margin edge into slits in pasting around angles and the curved edge.

Give your butterfly a tail like an ordinary kite, and, if you have an eye for color, mark it with spots and streaks of paint or use gayly colored paper or cloth.

The Boy Kite. The most interesting form of kite is most assuredly the boy kite, and the boy who has the patience and ingenuity to make one for himself is sure to be the envy of his companions. As the sketch will show, the finished product could be mistaken for nothing else than what it claims to be. Two straight sticks about three and one-half feet long are chosen for the legs and body; one,

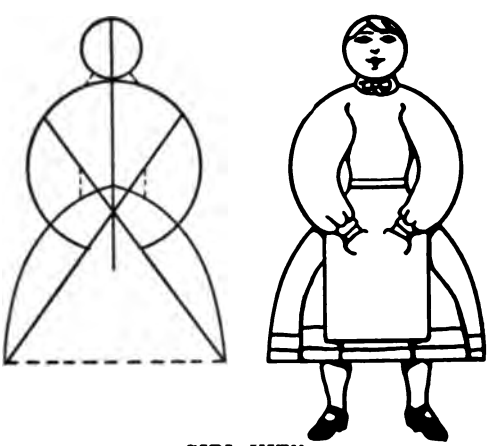
two feet, four inches, for the spine; and one, three feet, three inches, for the extended arms. From a light, flexible stick or a piece of rattan a circle seven inches in diameter is formed for the head, and this is fastened to one end of



THE BOY KITE
Framework and covering are shown.

the spine. Three inches below the circle is tacked the arm stick, with an equal stretch on each side, and to this, six inches from the spine, are fastened the leg sticks. These are crossed so that they are about three feet apart at the "foot" end, and are carefully wrapped where they meet the spine. Little crosspieces should next be fastened to the ends of the arm and leg sticks, and if the maker cares to take so much trouble he may fashion roughly hands and feet of the same material as the head.

The frame is then ready, and strings are stretched around it as indicated by the dotted lines in the illustration. Next, lay this framework on a large sheet of paper and cut around



GIRL KITE
Framework and covering are shown.

it, allowing a margin of a half-inch or more for pasting. In making the curve of the head it will be necessary to slit the edge of the paper to keep it from wrinkling. A bridle of string must be formed, following the lines of the leg sticks; to this the long string for flying may be attached about where the leg sticks cross the spine.

Kites of Other Lands. Fond as the American boy is of his kite, it does not mean as much to him as it does to the Chinese or Japanese, who has fewer toys. But in these Oriental countries it is not only the children but the adults who make and fly kites, and very elaborate are some of the forms. There are birds and butterflies, fish and dragons, and some of them are made of the thinnest, glossiest silk. The Chinese boy sometimes has three or four kites attached to one string, and becomes quite an adept at keeping them untangled. For kite-battles the Chinese boy makes for himself a simple, perfectly-square kite of tough tissue paper and two bamboo strips, and with this he attempts to entangle or destroy his playmates' kites. A.MC C.

KITE, a bird of prey belonging to the falcon family, but inferior to true falcon in having a much weaker bill and talons. The kites are distinguished by having long, pointed wings and forked tails. They are remarkable for their gracefulness of motion and for their ability to sail or glide for long distances, because of which characteristic the name was given to the toy kite. The common European kite, or glebe, is found in almost all parts of Europe, Asia and the north of Africa. In America there are four species, the Everglades, the Mississippi, the white-tailed and the swallow-tailed. The last-named is the largest and handsomest of the group, measuring four feet or more across the wings, with white head, neck and under parts, and the remaining upper parts, wings and tail a lustrous black. See FALCON.

THE KITE

KITTIWAKE, *kit'i waik,* a bird belonging to the gull family, which takes its name from its plaintive cry. Like other gulls it feeds chiefly on fish, and delights in soaring over the waves of the sea. Kittiwakes are found in great numbers in the Arctic regions of Europe

and North America. They breed on the coasts of North America from the Gulf of Saint Lawrence northward, wintering on the Great Lakes and on the Atlantic coast as far south as New York, and on the coasts of Great Britain. The nests are made of seaweed, large numbers being placed close together on rocky ledges. The eggs, numbering from three to five, vary in color from buff to grayish-brown and are marked with chocolate spots. The birds grow to a length of sixteen to eighteen inches and are generally white, with bluish-gray back and wings. The beak is yellow and the legs are brownish-black. On the British Islands kittiwakes have been ruthlessly slaughtered for the millinery trade.

KITTIWAKE

KLAMATH, *klah'mat,* the collective name of several tribes of American Indians, whose original home was along the Klamath River in Oregon and California. By a treaty negotiated in 1864 they were given their present reservation along Klamath Lake, at the base of the Cascade Range, covering 1,360 square miles. The Klamath formerly possessed the whole of Northern California and numbered among their tribes the Shastas and the Modocs. They were very warlike, but are now a civilized and industrious people, and are expert stockmen. In 1917 they numbered about 600. See INDIANS, AMERICAN.

KLAU'SENBURG, *klou'zen burk,* a town on Little Szamos River, one of the chief cities of Transylvania and formerly its capital. It is now capital of the county of the same name. It consists of an inner town, formerly fortified, and of five suburbs. The trade includes the manufacture and export of cigars, beet sugar and paper. It has a university and other educational institutions of importance, including a Unitarian College. The town also possesses a national museum, with antiquities, scientific collections, and a library of 45,000 volumes. Klausenburg was captured by Hungarian revolutionists during the uprisings of 1848. Population in 1910, of whom the greater part are Magyars, 60,800.

KLEPTOMANIA, *klep toh ma'ni a,* from two Greek words meaning *to steal* and *madness,* is the term applied to a form of mild insanity which manifests itself in an uncontrollable impulse to take some object which is the property of another. The person so affected is called a *kleptomaniac.* A kleptomaniac may be normal in other respects, and is to be distinguished from those suffering from well-defined forms of insanity in which the tendency to steal is one of several characteristics.

Kleptomania is not the same as shoplifting. The former is exhibited by persons who steal articles, not for their value nor because of actual need, but because they are acting under an irresistible impulse. Shoplifters commit the act of theft for the same reason that a pickpocket or a burglar steals. Kleptomaniacs sometimes pilfer objects which attract their attention, with no attempt at concealment.

Irresistible impulse is not held a valid defense in courts of law, unless it is shown that the defendant is unable to distinguish between right and wrong. There is a tendency, however, to recognize it as a defense when it is fully established that the accused is unable to control his actions. S.C.B.

Consult Kirchhoff's *Handbook of Insanity.*

KLON'DIKE, the scene of the greatest "gold rush" the world has ever known, quite eclipsing even the famous California gold boom of 1849. The Klondike is situated in the region surrounding Klondike Creek and its tributaries

THE KLONDIKE DISTRICT
It lies entirely in Canada, in the Yukon district.

in the Yukon district of Canada, to the east of the Yukon River and the Alaskan border line. G. W. Cormack, a prospecting miner and a native of Illinois, discovered rich gold deposits in this territory in 1896. He had located on the Klondike River for the purpose of salmon fishing, but that proving unprofitable, he abandoned it to seek gold.

The news of his success could not long be kept secret. The result was a rush of men from all parts of the world. The rigors of the climate had no terrors for the gold seekers, who represented every class of society. Clerks from cities, boys from the farm, bankers, lawyers, doctors and even experienced miners caught the gold "fever" and rushed to the neighborhood. Many died from privation and suffering before the land of gold was reached, but such experiences did not stop the rush. Juneau and Skagway leaped into prominence as depots and forwarding places for the mines in the interior. Dawson City, the chief town of the territory, had over 500 houses within less than six months from the day the first hut was built; a year later it was a prosperous city with banks, schools and churches, the center of the richest mining district in the world.

Within two months of the discovery, gold to the value of $5,000,000 had been taken out of the district. One miner returned to San Francisco, after a few weeks' absence, with $150,000. In five years gold to the value of over $30,000,000 was taken out of the Klondike mines. Since 1902 the quantity of gold found has somewhat diminished.

For seven months in the year the Klondike is an Arctic region. The ground is frozen to a depth of from three to ten feet, and the only way it can be worked is by thawing it with huge fires and then breaking it up with pick-axes. The broken earth is kept till spring, when the ice goes out of the streams. It is then washed in running water, which carries away the dirt and leaves the gold at the bottom of the pan in which it is washed. The Klondike region possesses little or no agricultural value, and its prosperity depends entirely on its gold supply. The summers are hot and humid, but are not long enough to produce crops. The Yukon district of Canada is governed by a commissioner, with headquarters at Ottawa, but is administered by the Royal Northwest Mounted Police. F.ST.A.

Consult Lynch's *Three Years in the Klondike;* McLain's *Alaska and the Klondike.*

Related Subjects. The reader is referred to the following articles in these volumes:

Alaska, subhead *Mineral Wealth*	Juneau
Canada, subtitle *Mining*	Royal Northwest Mounted Police
Dawson	Yukon
Gold	Yukon River

KNEIPP, *nipe,* SEBASTIAN (1821-1897), a village priest of Bavaria, famous throughout Europe as the "water doctor," because of the water-cure treatment which he administered, and whose book, *Meine Wasserkur* (My Water-Cure), has reached upwards of twenty editions. When he was in school in 1847 he came upon a small book treating of cold-water cures. One of his fellow-students became ill, and in the dead of night the two young men climbed out of the window of the seminary and at the pump in the yard Kneipp administered douches to his first patient, with happy results. He lived and practiced his treatment in the little town of Wörishofen in Southern Bavaria, near the River Wettbach, whose waters he employed in his practice. One of his requirements was that patients should walk barefooted in the dewy grass in summer and in the snow in winter. If the grass was not wet enough a garden hose was played upon it. Kneipp sanitariums have been established in many cities of the world.

KNIFE, *nife,* a cutting tool consisting of a blade and handle. Knives, together with razors and scissors, are classed by makers and traders as *cutlery.* They are grouped into two general divisions of *pocket knives,* which are provided with a spring and the blades of which fold into the handle; and *table knives,* including carving knives, bread knives, cooks' knives, etc.

How Knives Are Made. The best grades of pocket knives are forged by hand. The blades are made from strips of steel of suitable width and thickness. A blade maker cuts one of these strips into convenient lengths, heats a portion at the end to a cherry-red, roughly shapes the blade with a hammer, and cuts off from the length of steel enough for the blade and the part which joins it to the handle. This joining section is called the *tang,* and the shaping of the part is known as *tanging.* The rough shaping of the blade at first heat is known as *mooding.* After these two processes are completed the metal is reheated, the blade is worked again with a hammer, and the nail mark is cut. The latter is a groove along the edge of the blade, in which the thumb nail is inserted to open the knife. This third process is known as *smithing.*

For the purpose of giving the metal lasting qualities it is hardened and tempered before it leaves the forge for the grinding machine. Hardening is accomplished by bringing the blade to a red heat and dipping it suddenly in cold water. The tang, however, is left soft, that it may be easily filed, drilled and fitted into the handle. On it, too, is stamped the

maker's name. The hardening process leaves the steel brittle, and it must therefore be *tempered,* that is, brought to one of several degrees of hardness. Tempering consists in slowly heating the blade on a steel plate, the degree of temper required being judged by the color. Each color represents a different degree of hardness. Some blades are left a straw color, others a reddish-brown, and so on. After being tempered the blade is sent to the grinder, who places the tang in a holder, which he grasps with one hand. With the other he presses the blade against a grindstone which revolves at a high rate of speed. A final finishing is usually given the blade after it has been fitted to the handle.

The other parts of the knife are made by the material maker. He fashions the steel spring which controls the blade in opening and shutting, and the brass or iron lining of the handle (the *scale*), and it is a part of his work to fasten tips to the outside of the lining when the material which forms the handle does not cover the ends. The various parts of the knife are put together by the *cutler,* who also drills, files, polishes and buffs the handles. Ivory, pearl, silver, gold, tortoise shell, celluloid, rubber, various woods and other materials are used for knife handles They are polished on power-driven wooden wheels, which are covered first with leather and then with a mixture of glue and emery. In buffing, cotton cloth takes the place of the leather, emery and glue.

Similar processes enter into the manufacture of table knives. The more expensive blades are hand forged from shear steel, but cheaper ones are forged with machines called *goff hammers,* and are made from cast steel, which is more brittle than shear steel. Large power-driven stones are used in punching holes in the tangs and grinding the blades, but the finishing processes are done by hand. In some cases the blades are rough-ground by being placed in a brass frame, six or more at a time, the frame being so manipulated that it gives them a side-to-side and also a vertical motion on the stone. In American factories the greater part of the work is done by machinery, the cost of the knife increasing with the amount of hand work that enters into its manufacture. The cheapest knives are made in a single piece. Table knives used for cutting such soft substances as bread and meat are given a rougher, thinner edge than the ordinary pocket knife. Knives to be used on the dining table may be wholly of metal, in one piece, and plated either with nickel or silver. B.M.W.

KNIGHT. See CHIVALRY.

KNIGHTHOOD, *nite'hood,* ORDERS OF, in the modern sense of the term, are organized bodies of men constituting honorary associations established by a sovereign. In Great Britain there are seven associations of this character; these are the Orders of the Garter, the Thistle, Saint Patrick, the Bath, Saint Michael and Saint George, the Star of India and the Indian Empire. The title *knight* in Great Britain is conferred as a mark of honor and as a reward for personal merit or distinguished service, and entitles the holder to prefix *Sir* to his Christian name. Such knights may or may not belong to an order of knighthood; those who belong to no special order are properly called *knights bachelors.* Among the continental orders of knightwood are the Golden Fleece of Spain and Austria, the Seraphim of Sweden, the Black Eagle of Prussia, Saint Andrew of Russia and the Legion of Honor of France. Each order has its appropriate insignia, including usually a badge or jewel, a collar, a ribbon of a certain color, and a star.

In the Middle Ages there existed various associations or fraternities possessing property and rights of their own as independent bodies, which were known as orders of knighthood. Famous among these were the religious orders founded during the Crusades—the Templars, Hospitalers and Teutonic Knights.

Related Subjects. The reader is referred for further information to the following articles in these volumes:

Bath, Knights of the	Legion of Honor
Chivalry	Templars, Knights
Crusades	Teutonic Knights
Garter, Order of the	Thistle, Order of the

KNIGHTS HOSPITALERS, *nites hos'pi tal erz,* **OF SAINT JOHN,** called also KNIGHTS OF SAINT JOHN OF JERUSALEM, and later KNIGHTS OF MALTA, a religious military Order founded in a monastery at Jerusalem in 1048. The monastery was dedicated to Saint John the Baptist, and the monks were called Brothers of Saint John, or Hospitalers, for their early work was limited to hospital service, in caring for the poor and the ill and in assisting pilgrims. During more than 500 years the Order fought the Mohammedans, from its headquarters in Malta. When Napoleon captured that island in 1798 the Knights turned to Russia and assisted that state against France. England gained Malta in 1800, and from that

time the Order was undisturbed there, but it ceased to be a military or political body. The Pope was commissioned to choose its grand master, and it became essentially a religious Order, returning to its earliest functions, that of hospital service. Records of the Knights dating back to the twelfth century are preserved in Malta.

KNIGHTS OF COLUMBUS, a fraternal and benevolent organization to which male members of the Roman Catholic Church are eligible. It was founded in 1882 in New Haven, Conn., with the object of furnishing financial aid to its members and their beneficiaries and of establishing and promoting social and intellectual fellowship. The society is governed by a supreme council, the members of which are elected by the various state councils. The headquarters of the association are at New Haven, Conn., with branches in every state in the Union, in every Canadian province, in Cuba, Porto Rica, Newfoundland, the Philippine Islands and Alaska. On July 1, 1916, there were 368,135 members. See FRATERNAL SOCIETIES.

EMBLEM

Horizontal shading represents gold; perpendicular shading, blue; diagonal shading, red; unmarked spaces, white.

KNIGHTS OF LABOR, a national labor organization of the United States, organized in 1869 at Philadelphia, by a disbanded union of garment-cutters. It was intended to afford protection to the working classes. At first, everything about it except its symbol, a line of five stars, was kept secret because of the failure of other such unions and because many employers were opposed to organized labor. Anyone over sixteen, with the exception of lawyers, liquor-dealers, bankers and gamblers, was admitted. In seventeen years its membership had grown to 700,000, which, because of serious disagreements within the union, has diminished probably to less than 100,000. See LABOR ORGANIZATIONS.

KNITTING MACHINE, *nit'ing ma sheen'*, a mechanical device for knitting hosiery and underwear. The most common form now in use is circular; the needles are arranged in rows on a rounded frame, and a round web is produced. The needles have a straight up and down motion, produced by cams; each needle has a hook at the end, with which it draws down the thread and makes a loop. As a stocking or other garment is being knitted, the web extends downward through the circular opening between the needles and has a weight attached to its lower end to keep it in position.

The adjustment of these machines has been brought to a remarkable state of perfection, and when operated by power four of them can be tended by one boy. The first knitting machine was invented by William Lee, an Englishman, in 1589. Early in the eighteenth century an improved form was introduced into the United States; the great economical value of such a machine is clearly shown by the inventive genius of Americans, who within the nineteenth century secured nearly 2,000 patents covering improvements in it. In 1831 power was first applied to knitting machines, at Albany, N. Y. Formerly they were everywhere run by hand power.

KNOT, *not*, a mile at sea, equal to about 1.15 land, or statute, miles. Thus if a submarine makes twenty knots an hour at the surface it moves as fast as an automobile going twenty-three miles an hour; if it makes eleven knots submerged, its speed equals that of an automobile traveling twelve and two-thirds miles an hour. The knot used by the United States navy is 6,080.27 feet, "the one-sixtieth part of the length of a degree on the great circle (circumference) of a sphere whose surface is equal to the surface of the earth." The British admiralty uses a knot of 6,080 feet.

In the rope to which the old-fashioned ship's log was attached, pieces of string were inserted; one piece marked the first knot, two pieces the second, and so on. The knots were usually forty-seven feet three inches apart; if at the end of twenty-eight seconds, which is the same fraction of an hour that forty-seven feet three inches is of 6,080 feet, the log had pulled out five knots, the ship was moving five knots an hour.

The speed of sea planes or hydro-aeroplanes is measured in statute miles.

KNOTGRASS, *not'grass,* **KNOTWEED** or **DOOR-MAT,** a trailing weed belonging to the buckwheat family. It is one of the most widely-distributed plants in the world. Knotgrass grows low on the ground, in trampled places or in cultivated fields, and bears trailing, many-branched stems which form a thick mat. Clusters of two or three small flowers of pale greenish-pink grow between the upper surfaces of the leaves and the stems.

KNOTS, *nots,* in thread, string or rope, are made in many ways, especially by sailors. The harder you pull the cords in a good knot, the stronger it becomes. For most purposes a knot must be easy to tie and to untie. The clove-hitch (Fig. 14), for instance, is tied with only two motions and is untied as easily, but it is so strong that it is used to fasten large steamships to their piers.

How to Tie Knots. (1) This is a simple loop, the basis of all knots, called by sailors a *bight.*

(2) If you slip one end of the cord through the loop you have an *overhand knot,* the one knot that everyone knows how to make.

(3) If before you put the end through the loop you put it around the other end, you will have a *figure eight.*

(11) To shorten a rope temporarily make these two loops around the ends of a larger loop.

(12) Each of the ropes is fastened around the other in an *overhand knot* (2).

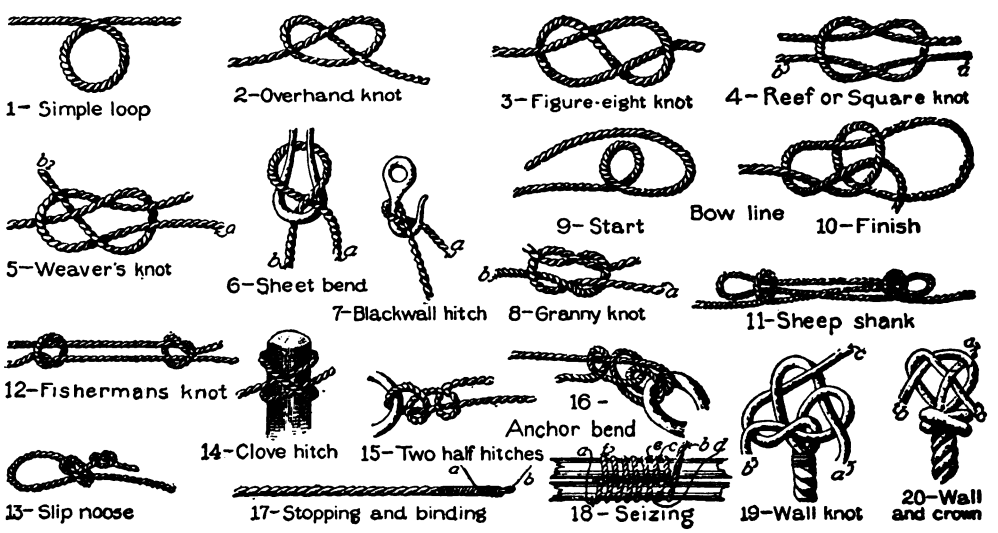
(13) This is a loop which works like a lasso. Instead of the metal ring we have an *overhand knot.* Another *overhand* prevents unfastening.

(14) To fasten a boat, slip on the spile a loop having the loose end of the rope underneath, and follow it by another.

(15) The two half-hitches, to fasten a boat to a ring, are really two *overhand knots* (2).

(16) Pass the end of the rope through the ring twice, making a loose loop, then around the other end and through the loop, finishing with a half-hitch (15).

(17) This is a method of fastening together the loose ends of a rope with thread. The thread is laid along the rope a few inches, as shown by the longer dotted line, then wound



HOW TO TIE KNOTS

(4) Put the end *a* over, under and over the end *b,* then bend both upward and do it again. This is one of the best and simplest knots, but be careful not to make it a *granny* (8).

(5) Put the end *a* over and under the end *b,* then put *b* over itself and under *a,* then *a* under *b* and over and through the loop; or, do as in (6).

(6) This method of fastening a rope to a hook is in principle the same as (5). Put the rope all the way around the hook from *a* and in finishing the loop bring the end *b* through the hook.

(7) This hitch is used in lifting heavy boxes. It is merely a loop through which the hook is inserted.

(8) Starting as in (4), reverse the second operation, putting *b* over, under and over *a.* This is not as good a knot as the *reef* (4).

(9), (10) With the loop as in (9), put the loose end up through it, around the other end, and back through the loop. Sailors painting the outside of a ship sit in a *bow-line* knot.

tightly to the end of the rope. The end *a* is then looped about *b,* threaded back beneath the winding as shown by the shorter dotted line, and drawn tight.

(18) This is a way that sailors fasten together two ropes or cables with a smaller one. At *a* an eye is spliced (see SPLICING) about one of the cables. The cord is led back and forth around the two cables, very tightly, to *b,* then into the empty space *c,* around to *d* and *e* and so on, till it reaches the cord *f,* under which it is led, the whole being finished with a *clove hitch* (14).

(19) This is to fasten the loose ends of the strands of a rope. Make a fold with *a,* loop *b* about the end of it, pass *c* around the end of *b* and through the loop of *a,* and tighten the knot evenly.

(20) Make the wall knot as in (19), then cross *b* over *a,* pass *c* around the end of *b,* under *a* and over *b.* Tighten evenly.

Consult Hasluck's *Knotting and Splicing Ropes and Cordage.*

)W-NOTHINGS, a political party in the l States, intended to be secret in char- which flourished from 1852 to 1860. It ted against immigration, and for that was called also the "American" party; osed the Church of Rome, and this prin- alienated voters who otherwise might joined it. Meetings were in secret, and ieasures promoted were never discussed ; when one not a member asked any on regarding its policies, the reply was, n't know." Constant repetitions of this gave the party its popular name. In he Know-Nothings carried Massachusetts elaware, polled over 125,000 votes in New and gained a considerable following in outh. By coalitions its members merged year 1860 with other organizations, prin- with the Republicans and Democrats, ir issues. See POLITICAL PARTIES IN THE D STATES.

OX, *nox,* HENRY (1750-1806), an Ameri- neral and statesman, who, because of his y, untiring energy and bravery, became f George Washington's trusted friends. tered upon a military career at an early nd at the ning of the lutionary distin- d himself as gineer and lerist. In he was ated com- er of artil- and rose y to the of major- ral. He ed under ington at battles of

HENRY KNOX
First Secretary of War of the United States.

on and Princeton and directed the artillery andywine and at Monmouth. For a time as a member of Washington's staff and ppointed by him to receive the surrender British forces in New York state. Knox e Secretary of War in 1785, before the ion of the Constitution, and in 1789 was nted to the same office by President ington.

OX, JOHN (1505-1572), the leading spirit e Protestant Reformation in Scotland, a whose fearlessness, resolution and stern ctions of righteousness and of duty made a lasting impression upon the Scottish people. In the minds of his countrymen, John Knox, more than any other man, shaped the religious individuality of Scotland. He was born at Giffordgate, near Haddington. Much obscurity surrounds his early life, but it is supposed that he attended the universities of Glasgow and of Saint Andrews, though he was a graduate of neither. At some unknown date he was ordained for the priesthood, but before the year 1544 he embraced Protestantism, for at that date he appeared as the friend and companion of the famous Scotch reformer, George Wishart.

JOHN KNOX

In 1546 Wishart was tried for heresy and condemned to be burned at the stake by order of Cardinal Beaton, Roman Catholic archbishop of Saint Andrews. Not long afterwards the cardinal was murdered by friends of Wishart, and Knox began his career as a leader in the Reformation by preaching to the Protestants who had taken refuge in the archbishop's castle in Saint Andrews. A year later he was vigorously upholding the new doctrines as pastor of the parish church in the town, but his activities were cut short in July, 1547, when Saint Andrews surrendered to a French fleet.

With others, Knox was captured, and for nearly two years was kept a prisoner on board the French galleys. In 1549 he was set at liberty at the request of King Edward VI of England, and, having taken up his residence in England, was appointed one of the king's chaplains. He then took a leading part in the English Reformation and was active as a preacher until the accession of the Catholic Queen Mary drove him to the Continent in 1554. In 1556 he became pastor of the English church at Geneva, Switzerland, where he remained for three years.

The year 1559, the date of his return to Scotland, marks the beginning of a career of triumph for Knox. At Perth, where he preached a stirring sermon on the "Idolatry of the Mass," the people were roused to such a pitch that they attacked the churches, overturned altars, broke the images and destroyed monasteries. The flames of the religious revo-

lution were soon raging throughout the country, and in 1560 the Protestant faith was formally adopted as the state religion. *The Confession of Faith* and *First Book of Discipline,* issued at that time, were primarily the work of Knox.

A new crisis was reached, however, when, in 1561, Mary Queen of Scots (see MARY STUART) returned to Scotland. She was devoted to the Roman Catholic Church, and there was not one bond of sympathy between her and the stern and unyielding reformer, who preached against her with a bitterness that alienated the more moderate leaders of his own party. Knox was indeed forced into comparative privacy between 1563 and 1565, but Mary, by her reckless marriage with Lord Darnley, and her unfortunate one with the Earl of Bothwell, brought upon herself her own undoing, and after her abdication in 1567, Knox regained his former power and influence. During the civil war that broke out in Scotland in 1570 the aged reformer retired to Saint Andrews to escape threatened assassination, and there, in the church where he had begun his work as a minister, he preached his last sermons. In 1572, "weary of the world," he returned to Edinburgh to die. His work, however, was accomplished, for Scotland had been won permanently for Protestantism.

In his *History of the Reformation of Religion in Scotland,* Knox wrote his own biography. The latter part of this was compiled from notes found after his death. Famous among his other works is his *First Blast of the Trumpet against the Monstrous Regiment of Women,* directed against Mary of England, Mary of Guise, and her daughter, Mary Queen of Scots. G.W.M.

Consult Lang's *J. Knox and the Reformation;* Crooks' *John Knox.*

KNOX, PHILANDER CHASE (1853-), an American political leader and lawyer, born in Brownsville, Pa., and educated in Ohio. After developing a large practice in Pittsburgh as a corporation lawyer and serving as assistant United States district attorney, he became Attorney-General of the United States in President McKinley's Cabinet, in April, 1901. In this position he was retained by President Roosevelt. In 1904 Knox was appointed to the United States Senate by Governor Pennybacker of Pennsylvania, to fill the unexpired term of Matthew S. Quay, and in 1905 was reëlected to the Senate. He became Secretary of State in March, 1909, and retired to the practice of law at the end of the Taft administration.

PHILANDER C. KNOX

KNOX COLLEGE, a coeducational school, one of the pioneer institutions of learning in the Middle West, founded in 1837 at Galesburg, Ill. Although its policies have been distinctly religious, the institution is undenominational. Besides the department of liberal arts the college has an excellent conservatory of music. Degrees of A. B. and B. S. and Mus. B. are granted. In 1858 one of the famous Lincoln-Douglas debates was held on the campus of Knox College.

The original funds for the founding of the school were secured by a subscription of $40,000, with which it was planned to buy Mississippi Valley land at government price of $1.25 per acre, later to sell it to the colonists at $5 per acre. Those who subscribed an amount sufficient to buy eight acres were given one free tuition for a period of twenty-five years. The endowment funds now exceeed $500,000. On June 8, 1916, a campaign for an additional $500,000 of endowment was successfully completed with subscriptions totaling over $535,000. When paid in this will make the total endowment of the college approximately $1,000,000. Tuition and fees, except in the conservatory of music, are $75 a year. There are about forty instructors and over 650 students, including those of the conservatory. The library contains about 14,000 volumes, supplemented by the city library on the same grounds with the college buildings, which has 40,000 volumes. The college confines itself strictly to the four years of undergraduate work, thus allowing it to concentrate its full energies on these important and formative years. K.D.MCC.

KNOXVILLE, TENN., the county seat of Knox County, is an educational and commercial city in the east-central part of the state. It is on the right bank of the Tennessee River, four miles below the junction of the French Broad and Holston rivers, and is centrally located in a picturesque hilly valley at an altitude of 1,000 feet, between the Smoky Mountains on the east and the Cumberland Mountains on the west. A delightful climate is the result of the elevation and the protection

afforded by the hills. The city is on the Knoxville & Augusta, the Knoxville & Bristol, the Louisville & Nashville and the Southern railroads and is a port for small steamboats which ply the Tennessee and French Broad rivers for two-thirds of the year. A splendid steel bridge spans the river between Knoxville and South Knoxville. The area is over four square miles. Knoxville is the fourth city of the state in size; the population in 1910 was 36,346; in 1916 it was 38,676 (Federal estimate).

The attractive parks of the city include Chilhowie and Circle parks and Emory Place, which contain national and Confederate monuments. The marble Federal building, customhouse and post office; the county building, surrounded by parked grounds; the city hall; Lawson-McGhee public library; Y. M. C. A. and Y. W. C. A. buildings; the Auditorium and the city markets are noteworthy buildings.

Institutions. Knoxville is the seat of the University of Tennessee (attended, in 1916, by more than 4,000 students), the East Tennessee Female Institute, the Tennessee Normal College, University Preparatory School and Saint Mary's Academy. Knoxville College, a United Presbyterian school for colored students, is located here. The city also contains the State School for Deaf Mutes and a branch of the State Hospital for the Insane.

The benevolent and charitable institutions include the Lincoln Memorial and Knoxville general hospitals, the Industrial School for Juveniles, an orphanage and a home for aged women.

Industries. A great variety of valuable timber, coal from rich coal fields (the Coal Creek and Jellico districts), iron ore, pottery clays, marble and zinc are the raw materials easily accessible for the trade and manufactories of Knoxville. The sawing and polishing of marble from large quarries near the city is one of the most important industries. Next in importance is the manufacture of woolen and cotton goods, flour, furniture and cabinet mantels, pottery, boilers, stoves, bar iron, castings, caskets, iron fencing, ready-made clothing, zinc products and desks. Knoxville is an important wholesale center and conducts a large shipping business by rail and by boat throughout the surrounding country. Car and repair shops of the Southern Railroad are located here.

History. The first building on the site of Knoxville was a blockhouse erected in 1791 by General James White for the protection of settlers against attacks of Cherokee Indians. Barracks were later erected and for many years the settlement, named in honor of General Henry Knox, the first Secretary of War, was frequently attacked by Indians. It was the capital of the "Territory South of the Ohio" from 1792 to 1796, and was the state capital until 1811 and again in 1817. A city charter was granted in 1815.

In 1911 the commission form of government was adopted. The city owns and operates the water system, purchased in 1909. J.L.B.

Consult Powell's *Historic Towns of the Southern States.*

KOALA, *ko a'la,* a small, pouched animal of Australia, resembling the bear in appearance and the sloth (which see) in its lethargic disposition. It is sometimes called the *Australian bear, pouched bear* or *native sloth.* It is about

THE KOALA

twenty-four inches long and twelve inches high at the shoulder, and has no tail. Its fur is very thick, soft and woolly, reddish-gray above and yellowish-white below. The head is thick, the snout short and the mouth provided with cheek pouches. Its long toes enable it easily to grasp the branches of trees, from which, like the sloth, it often hangs with its back downward. It sleeps in the daytime in the top of some blue-gum (eucalyptus) tree, on the leaves of which it feeds, but it also roams around on the ground digging up roots. The mother carries her cub in her pouch when it is very young, and when old enough to leave the pouch it rides on her back. The natives of Australia eat the flesh of the koala, and often climb the highest trees in search of the animals.

KOBE, *ko'be,* a seaport of Japan, on the southern coast of the island of Hondo. In 1892 it was merged with Hiogo, a town which adjoined it directly on the southwest. Kobe has a fine, deep harbor and enjoys direct steamship communication with China, Australia, Hong-kong and various European and Ameri-

can ports. It is one of the most healthful and attractive of Japanese ports, and has a more extensive trade than any of the other cities opened by treaty to foreign commerce. About 2,800 vessels enter and clear the harbor each year. Kobe boasts of fine docks, railway shops and a shipyard. Paper is its chief article of manufacture. Population, 1913, 442,167.

KOCH, *koK,* ROBERT (1843-1910), a German physician famed for his researches in the field of bacteriology, especially for his discovery, in 1882, of the specific germ which causes tuberculosis of the lungs (see TUBERCULOSIS). He also identified the bacillus which produces Asiatic cholera, and devised a method of inoculation to prevent anthrax (which see). In the year 1890 it was reported throughout the world that Dr. Koch had discovered a cure for one of the greatest enemies of the human race—consumption. What he actually accomplished was the preparation of an extract, or lymph, obtained from bacilli, which is chiefly valuable as a test in diagnosing cases of tuberculosis. His work included also a study of blood infections in East Africa and of the West African "sleeping sickness," and the identification of the parasites which cause "coast fever." In Germany he was honored by appointment to a professorship in the University of Berlin (1885), and was also made director of the new Hygienic Institute. In 1905 he was awarded the Nobel prize for medicine. See BACTERIA AND BACTERIOLOGY; DISEASE, subhead *Germ Theory of Disease.*

ROBERT KOCH

KO'DOK, a small town in the Sudan, founded by the Egyptian government in 1865 as Fashoda. It never attained any geographical or commercial importance, but in 1898 it became the center of a political storm which for a time strained the friendly relations between Britain and France. The town had been deserted at the time of the Mahdist rebellion in 1881 and was occupied by French troops in 1898. The British demanded its evacuation, in return for which they were compelled to make commercial and political concessions to the French in Africa. See EGYPT.

KOH'INOOR, or KOHINUR, a Persian word which means *mountain of light,* is the name of a famous diamond belonging to the British crown jewels. According to tradition, it was found in India long before the Christian Era, was handed down through a long line of Indian princes and came into the possession of England in 1849, through the conquest of the Punjab, or Northwest India. It was presented to Queen Victoria by the East India Company. Originally it weighed about 900 carats, but was reduced by poor cutting to 279 carats and in 1852 to 102¾ carats. Its value is estimated at about $600,000. A model of the Kohinoor is on exhibition in the Tower of London.

KOHL-RABI, *kohl'rah bi,* or, more properly, KOHLRUBE, is a cultivated variety of the cabbage plant, in which the stem above the ground enlarges into a bulblike growth. It is used as a vegetable and resembles in taste the rutabaga, or Swedish turnip. Leafstalks spring from the round formation and add to the unusual appearance of the plant. Kohl-rabi is cultivated like cabbage, and in Europe is grown to a considerable extent, but in America it is not very popular. In recent years it has appeared more frequently in the markets.

KOHL-RABI

KO'KOMO, IND., the county seat of Howard County, and a thriving manufacturing city, situated north of the geographical center of the state, on Wildcat Creek. Indianapolis is fifty-four miles south, Logansport is twenty-three miles northwest, and Chicago, also northwest, is 140 miles distant. Kokomo has good transportation facilities through the Lake Erie & Western Railway, constructed to the city in 1854; the Pittsburgh, Cincinnati, Chicago & Saint Louis, built to this point in 1859; the Toledo, Saint Louis & Western (1880), and the excellent interurban electric service for which the state is noted. The city was settled in 1844, was incorporated in 1865 and named for the Indian chief, Kokomoko. In 1910 the population was 17,010; it has increased to 20,930 in 1916 (Federal estimate). The area of the city is three square miles.

Kokomo is a commercial and industrial city; it has a number of public playgrounds and a large park covering sixty acres. There are twenty-eight churches, a $175,000 high school building, a $125,000 Y. M. C. A. building, a $100,000 Federal building, erected in 1912, a $60,000 city building, a $55,000 hospital and a Carnegie Library.

Kokomo's leading products are flint, opalescent and plate glass, the output of the last named being most extensive; its opalescent glass is about half of the world's product. There are manufactories of automobiles, rubber tires, furnaces, stoves, nails, pottery, paper, pulp, aluminum castings and electrical appliances. The first gasoline automobile made in the United States was constructed and operated in Kokomo, by Elwood Haynes, assisted by Apperson Brothers, in 1893. The city claims the further distinction of being the first in the United States to make aluminum crank cases for automobiles. W.H.A.

KONGO, a form of the word CONGO (which see).

KÖNIGSBERG, *koe'niKs berK,* a town and fortress of East Prussia, Germany, about 366 miles northeast of Berlin. Although founded in 1255, it is a strictly modern town, since very few of its old buildings are now in existence. It is one of the chief continental centers for the tea trade and the center of the Prussian amber trade, and it also exports immense quantities of corn. It prepares over 175 tons of meerschaum annually. Its manufactures include pianos, thread, tobacco, cigars and machinery. The commercial importance of the city has been enhanced by the construction of the Königsberg Ship Canal, extending to the city of Pillau, on the Bay of Danzig. Chief among the buildings of historical interest is the Schlosskirche (Castle Church), where Frederick I and William I were crowned. The university, founded in 1544, is attended by 1,700 students, and in addition to its library of about 318,000 volumes there are a zoölogical museum, an observatory and a bontanical garden. Near the great Gothic cathedral is the grave of Kant, who was born in the city. Königsberg was first fortified in 1626, but was converted into a modern fortress of the highest rank in 1843. Population, 1910, 246,000.

KOO'DOO, or **KU'DU,** the South African name of an animal about four feet high and eight feet long that belongs to the antelope family. It ranges from Cape Colony to Somaliland, in the east-central part of the continent. The body is of a grayish-brown color and is marked in both sexes with white vertical lines on the sides and a narrow white stripe along the back. The male has fine, screwlike horns about four feet in length, but the female is

THE KOODOO
Male at right; female at left.

hornless. A smaller species is also found in Northeast Africa, but is distinguished by having no fringe on the throat.

KOOTENAY, KUTENAI, or **KOOTENAI,** *koo'te nay,* a small group of North American Indians, constituting the distinct stock of Kitunahan. Their former home was in the valleys along the Kootenay River and the Arrow Lakes, north and south of the boundary between British Columbia and Montana. They now live on reservations in the same regions. The Kootenay have long been noted for their honesty and their friendliness to the white people. There are about 550 in British Columbia, and about 600 on the Flathead Reservation in Montana (1916). They are devout Roman Catholics. See KOOTENAY RIVER AND DISTRICT.

KOOTENAY RIVER AND DISTRICT, an important Canadian river and the region drained by it.

The River. Like the Columbia, of which it is one of the largest tributaries, the Kootenay rises in the southeast part of British Columbia, on the western slope of the Rocky Mountains. The Columbia first flows north, makes a sharp bend, and then flows south, whereas the Kootenay first flows south for about 200 miles and then turns north to meet the Columbia. In traversing this figure *U,* from its source to its mouth, the Kootenay flows about 450 miles, but the distance in a straight line is no more than 140 miles. The base of the *U,* an irregular semicircle about 125 miles long, lies in the state of Idaho. Reëntering British Columbia, the river forms what is known as the South Arm of Kootenay Lake,

and running north unites with the North Arm, then turning west empties into the Columbia River about twenty-five miles north of the international boundary. Navigation of the river is practically impossible because of its rapid flow, many sharp turns and numerous rapids.

Kootenay District. The Kootenay District, or Kootenay County, as it is often called, is a triangular section in the southeast corner of British Columbia. It comprises all of British Columbia south and east of the Big Bend of the Columbia River, thus including about 7,500 square miles of the Columbia's drainage basin and 15,000 square miles—practically the whole—of the Kootenay's basin.

Both in East and West Kootenay are large areas of arable lands. Numerous lakes and streams provide water for irrigation wherever it is necessary, and also furnish cheap transportation during the open season for navigation. Transportation is also provided by the Kettle Valley Railway and by the main line and the Crow's Nest Pass branch of the Canadian Pacific. Fruit-growing, dairying and mixed farming are all carried on with profit. Much of the land is well-timbered, and lumbering is second among the industries. The chief industry, and the one for which the Kootenay is most famous, is mining. Gold, silver, lead, zinc and copper are plentiful in the mountains, and coal and petroleum are found in the valleys and passes. The development of the coal fields in the Crow's Nest Pass and the Nicola Valley and of the metal mines in several sections is chiefly responsible for the district's remarkable increase in population since the beginning of the twentieth century. The chief cities in the Kootenay District are Fernie, Nelson, Revelstoke, Rossland and Trail, each of which is described in alphabetical order in these volumes.

One of the most beautiful stretches of country in North America, one of the richest in mineral and timber wealth and in fertility of the soil, is the long valley extending from the Big Bend of the Columbia River southward into the United States, the valley in which rise both the Columbia and the Kootenay. At the Canal Flats, near the source of the Columbia, the two rivers flow within a few hundred yards of each other, one to the north, the other to the south. At this place a canal was made uniting the two rivers, but as it was found to be changing the flow of water, only one boat was taken through, and the canal was abandoned. West of the Purcell Range is another splendid valley in which lie the Kootenay Lakes, and still further west, beyond the Selkirk Mountains, is the valley of the Arrow Lakes. This region of alternate mountains and valleys is still inhabited by wild game of many kinds, and is a favorite resort for hunters and lovers of magnificent scenery. W.B.

KORAN, *ko rahn'*, the sacred scripture of the Mohammedans, accepted by the faithful as the revelation of Allah (God) to Mohammed. They overlook its fables, and profess the belief that in the beginning it was written in golden rays on a great tablet in Heaven, and was then communicated to Mohammed by the angel Gabriel. The Koran explicitly states that it was written by piecemeal and *sent down,* or revealed, during a period that covers Mohammed's entire prophetic career, from A.D. 610 to 632, the first parts being dictated while he was at Mecca, and the remainder after his flight to Medina.

At the time of the first revelations Mohammed named the book *The Koran,* meaning *that which is to be read,* and after his death its fragments were ordered to be collected by Abubekr, Mohammed's father-in-law. Its authorized text was produced under Caliph Othman in A.D. 652.

Size and Divisions. The Koran is about the size of the New Testament, and is divided into 114 *Suras,* or chapters, which vary in length from many verses to only a few lines. It is written in pure Arabic without connecting narrative or story.

Its Doctrines. The leading doctrine of the Koran is the Oneness of God, clearly laid down by the statement, "God is God and Mohammed is His Prophet." It dwells on the Resurrection, prescribes fasting, the pilgrimage to Mecca, and the giving of alms, which is made obligatory. Prayer is called the key to paradise, and it is prescribed five times a day, with the suppliant's face turned toward Mecca. It follows the Mosaic law concerning inheritance, divorce and polygamy, and its moral precepts would enforce the virtues of humility, temperance, courage and justice. Death in the cause of religion is extolled; it is promised that the faithful who die in battle against "infidels" shall have greatest future glory, and this adds a frenzy to ordinary zeal in all "holy" wars.

Influence of the Koran. The Koran controls the lives of at least 148,000,000 of the human race, and Mohammedan children use it almost as their only schoolbook. The doctrine that

it is an inspired book has been assailed at times even among Moslems; in 1842, however, Harun II forbade all discussion of the book, and it is since reverenced by Mohammed's followers as the only religious authority.

Related Subjects. The reader is referred to the following articles in these volumes:

Mohammed	Religion, subhead
Mohammedanism	*Religions of the World*

KORDOFAN, *kawr do fahn',* a province of Egyptian Sudan, between Darfur and the White Nile. Although a hilly, barren, desert region during most of the year, it becomes a malarial swamp during the rainy season. The inhabitants are mostly Arabs and Berbers, though there are several half-savage negro tribes in the south. During the dry season the inhabitants wander from place to place to find pasture and water for their camels, goats and oxen, or camp around some well or village; but when the wet season comes and the dry rivers are flooded and the wells are full, they plant their fields of millet and sesame and gather the gum of the acacia, which is used in making glue. This gum, ostrich feathers, and their herds of cattle, goats and camels constitute the chief wealth. The main city, El Obeid, is the center of three caravan routes, bringing ivory, feathers and gum. Before 1821 Kordofan belonged first to one tribe, then to another; in 1821 it was made a province of Egypt, but revolted in 1882 and was independent until taken control of by the British Sudanese government in 1889.

KOREA, or **COREA,** *ko re'a,* formerly a small, independent kingdom of Eastern Asia, occupying the peninsula between the Sea of Japan and the Yellow Sea. When the country passed under the government of Japan in 1910, the name Korea was abandoned, the peninsula becoming officially known as *Chosen.* For description, see CHOSEN.

KOSCIUSKO, *kos i us'ko,* THADDEUS (1746-1817), a Polish patriot, distinguished for his valiant service to the United States in the Revolutionary War. He was born in Lithuania of a noble but impoverished family, received his military training at Warsaw and Versailles, and became a captain in the Polish army. In 1776 his sympathy for the American patriot cause led him to embark for America, where he served in the Revolutionary army. He was appointed chief engineer in charge of construction at West Point and became adjutant to General Washington. In 1786 he returned to Poland, and in 1789 was appointed major-general of the reorganized Polish army. In 1794 he became commander-in-chief and dictator of the Polish insurgent forces and was victorious over the Russians near Cracow. In 1794 at the battle of Maciejowice, he was overwhelmed by superior forces, wounded and imprisoned. He was confined in Saint Petersburg (now Petrograd) for two years, but was liberated on the death of the Empress Catharine. In 1817 he freed the serfs on his estate in Poland. He died at Solothurn, Switzerland, from injuries sustained in a fall from his horse.

KOSSUTH, *kosh'oot,* but more commonly *kah sooth',* LOUIS (1802-1894), a Hungarian patriot, statesman and orator and the national hero of Hungary, was born in Monok. His parents were of noble descent, and his father was a prominent lawyer. He received his education at Budapest University, and in 1832 entered the upper house of the Hungarian Diet as a substitute for an absent member. The young man at once joined the movement for political reform and soon acquired a strong influence. For publishing parliamentary debates he was condemned to an imprisonment of four years, but was released after one year. In 1841 he became editor of the Pesth *Journal,* an extremely liberal paper, and at the outbreak of the revolution in Vienna he became the Hungarian leader.

In September, 1848, Kossuth was made president of the committee of national defense, and thereafter he kept the direction of the government in his own hands. He issued the declaration of Hungarian independence in 1849 and was appointed responsible governor, but the intervention of Russia made further efforts useless, and he resigned in favor of Görgey, who then surrendered to the Russians. Kossuth went to Turkey, where he was virtually kept a prisoner, but was liberated in 1851, and sailed on the *Mississippi* for America as the guest of the nation, the vessel having been dispatched by the United States government for that purpose. He made many speeches in American cities urging the claims of Hungarian independence. In 1852 he returned to Europe, but was never reconciled to the Union between Hungary and Austria and preferred to live in Italy. He died in Turin and his body was taken to Pesth. At the time of his burial the whole Hungarian nation united to do him honor.

Consult his *Memoirs of My Exile;* Creelman's *On the Great Highway.*

KOUMISS, or **KUMISS,** *koo'mis,* a fermented beverage made in Russia from mare's milk. Near Petrograd there is a sanitarium where mares are kept for the special purpose of furnishing milk for this beverage. It is usually made by placing old or sun-dried koumiss deposit in a vessel and adding to it freshly-secured mare's milk. During the process of fermentation, which requires from thirty to forty-eight hours, the vessel is violently shaken at intervals, which churns the butter fat. This fat is then removed. Elsewhere in Europe and in America koumiss is made by adding sugar of milk to cow's milk, allowing the mixture to ferment in open tanks, removing the casein and butter fat and putting the liquid in bottles during fermentation. Koumiss is highly nutritive, is easily digested, and is regarded as a valuable portion of the diet for dyspeptics, tubercular patients, and those who are recovering from acute fevers. One quart of koumiss contains four ounces of solid food; the alcohol content is from one to three per cent. It tastes something like buttermilk.

KOVNO, *kawv'no,* a town of Russia, situated near the Polish border in the government of Kovno, of which it is the capital. It is 506 miles southwest of Petrograd. Founded in the eleventh century, it became Russian in 1795, after the third partition of Poland. Many of its buildings are of great antiquity, and across from the town hall there is an iron pyramid celebrating the departure of the army of Napoleon in 1812. Kovno is a manufacturing town, the chief articles of commerce being wire and nails. Formerly there was a large grain trade, but this is steadily decreasing. The population is about 88,000, of whom nearly one-half are Jews. Kovno is remarkably well fortified, but on August 19, 1915, it surrendered to the German forces, commanded by Field Marshall Von Mackensen (see WAR OF THE NATIONS).

KREFELD, or **CREFELD,** *kra'felt,* a manufacturing town of Western Germany, thirty-four miles northwest of Cologne. It is the center of the silk and velvet industry in Germany, the principal products being silk for umbrellas and ribbon velvet. There are, too, large engineering and machine shops, soap, chemical, candle and paper factories, cotton, woolen and hosiery mills and distilleries.

Krefeld is one of the few *open* towns of Germany; instead of the usual walls and fortresses about the town, four broad boulevards make a rectangle of the inner town. Until the sixteenth century it was an insignificant town; it was given municipal rights in 1373 by Charles IV, but remained a property of the counts of Mörs, and went with that country to the princes of Orange and then to Prussia. In the sixteenth century, however, the religious persecutions throughout the country drove many Calvinists and Separatists to Krefeld, where they started the manufacture of linen. The silk industry was introduced in the eighteenth century, and since then the town has grown rapidly. Population, 1910, 129,406.

KREM'LIN, from the Russian word *kremli,* meaning *fortress,* is a name descriptive of the citadel of a Russian city. The best known is that of Moscow, which consists of a triangular enclosure about one and one-half miles in

THE FAMOUS KREMLIN

circuit and fortified by walls which are surmounted by cylindrical and square towers. The present walls have existed since 1492. The Kremlin contains the old imperial palace, several imposing cathedrals, a monastery, convent, arsenal and the Great Bell of Moscow, which was cast in 1733, measures sixty feet in circumference and weighs 200 tons (see BELL). The larger part of the great palace dates only from the middle of the nineteenth century, the edifices which preceded it having been burned, the last one by order of Napoleon, on the occasion of his invasion of Russia in 1812. The red staircase, one of the noteworthy features of the palace, is used only for state functions, and is associated with many historic scenes during the reigns of Ivan the Terrible and Peter the Great. The treasury is famous for its collection of ancient jewels and plate.

KRONSTADT, or **CRONSTADT,** *krohn' shtaht.* Russia's most important naval station in its northern waters, situated twenty-one miles west of Petrograd, on the eastern extremity of the Gulf of Finland. In its three harbors 1,000 vessels can be accommodated, but these are closed by ice throughout five

s of the year. In addition to its naval
, Kronstadt has a naval school, govern-
avy yards, a cannon foundry and numer-
ipbuilding yards. The city was founded
ter the Great in 1710. Population, 1911,

POTKIN, or **KRAPOTKIN**, *kra pawt'* PETER ALEXEYEVITCH, Prince (1842-), sian Nihilist and geographer. He made manent contribution to science by his ation, in 1873, of a map and paper show- at the maps of Asia then in circulation an entirely incorrect representation of ysical character of the continent. His eries were the result of explorations un- en in 1864. In 1871 he made an impor- xpedition to Finland and Sweden for the n Geographical Society. By this time tkin had become deeply interested in inciples of the Russian Nihilists (which and thenceforth he devoted himself to ause. His activity caused his arrest and onment in 1874, but two years later he d. In 1878 he began to edit a revolu- y organ, *Le Révolte,* in Switzerland. 1886 he has made his home in England, he gives all of his time to writing and ng in behalf of anarchism. His publi- s include *Terror in Russia* and *Memoirs evolutionist.*

JGER, *kroo'ger,* STEPHANUS JOHANNES s (1825-1904), a South African soldier tatesman, who reached the summit of atness as President of the South African lic in 1883, and was reëlected succes- in 1888, and 1898. ent Kruger, gh only a uneducated of the wil- s, attained kable suc- a military and a dip- He was near Coles- in Cape y. He ad-

"OOM PAUL" KRUGER

l steadily through the inferior offices of imitive Boer republic, and became field- , district-commandant and commandant. stinguished himself in many wars, and the Transvaal became involved in civil etween 1860 and 1870 Commandant Kru- ught valiantly.

When Van Rensburg became President of the Boer Republic Kruger was elected commandant-general. In 1876 he became Vice-President of the republic, and the following year, when the British took over the Transvaal, he headed the famous triumvirate, the other two members being Pretorius and Joubert, which demanded their country back for the Boers. He directed the Boers' affairs with surprising success in the war of independence. In the years that followed, as President of the New South African Republic, he was at the height of his fame.

"Oom [Uncle] Paul," as Kruger was called, was held in high esteem by his constituents, and his words were accepted as proverbs in the Transvaal. When he was warned against Jameson, instigator of the famous Jameson Raid through the Transvaal, in 1895, he answered the people by referring to the tortoise,— "We must wait until the beast has stretched his neck well out of his shell, then we can cut it off."

The South African Republic was then entering upon a critical period, for British aggression against the Boers was becoming increasingly pronounced. Kruger's refusal to submit to what seemed unbearable tyranny brought on war in 1899. When the British advanced toward Pretoria in 1900 Kruger moved his headquarters eastward and crossed into the Portuguese possessions in September. A month later he sailed for Europe and made his home at The Hague until his death. His body was afterwards taken to Pretoria for burial.

Related Subjects. The reader is referred to the following articles in these volumes:
Jameson, Leander Starr Transvaal, The
South African War Union of South Africa

KRUPP, *kroop,* FRIEDRICH ALFRED (1854-1902), grandson of Friedrich Krupp, founder of the great Krupp works, who was known throughout Germany as the cannon king. He was born at Essen in Prussia, and after the death of his father, undertook the expansion of the works and also established the Germania shipbuilding yard at Kiel. By the invention of a new process for Bessemer steel he made cannons and a seamless tire for car wheels, and also hardened armor plates for warships. This new method gives the surface a glasslike hardness which shatters the projectile when it strikes. Branches of the works have been established at Annen, Kiel and Gruson, in Magdeburg; the whole number of persons employed is about 43,000, and the Krupp works

[illegible] Kyoto [illegible]

KYANITE, [illegible] [illegible] The principal [illegible] Massachusetts, Connecticut, Delaware, [illegible] the Tyrol and Bohemia. [illegible]

KYOTO, or **KIOTO**, *kyo'toh*, the ancient [illegible] capital of Japan, is situated on the [illegible] of [illegible] on an extensive plain, [illegible] miles [illegible] of [illegible] with which it [illegible] by railway. Kyoto is regularly [illegible] built on the rectangular system. [illegible] by an air of refinement, and m[illegible] [illegible] and pleasure gardens add to [illegible]. The embroideries, enamels [illegible] work of Kyoto are marvel[illegible] [illegible] and its pottery, porcel[illegible] [illegible] ornaments, crapes, vel[illegible] [illegible] are famed throughout the wo[illegible] The chief buildings of interest are the [illegible] palace of the mikado and the r[illegible] dence of the shogun, which since the aboli[illegible] of the office of shogun has been the seat of [illegible] city government. There are many fine tem[illegible] and schools and an imperial university. Po[illegible] lation, about 443,000.

THE WORLD BOOK
ORGANIZED KNOWLEDGE IN STORY AND PICTURE

L l

L, the twelfth letter of the English alphabet, was derived through the Greek and Roman from the Phoenician *lamed*. The Phoenician letter resembled a capital *L*, though the angle formed by the two lines was considerably less than a right angle; the word *lamed* is supposed to have meant *ox goad*, and the letter to have been a picture of a whip with a lash. The Greeks changed the form of the letter so that it resembled an inverted *V*, but the Romans wrote it practically as capital *L* is made to-day. In sound, too, the letter has always been what it is at present, a liquid, or semivowel. It is very closely related to *r*, and the two are often substituted for each other in allied languages.

English has examples of words in which the *r* sound is given to *l*, as the first *l* in *colonel*. Many savages, it is said, cannot distinguish the two sounds, and it was very difficult at first to find out whether the capital of the Hawaiian Islands was *Honolulu* or *Honoruru*, as the natives used the two indiscriminately, seeming to perceive no difference in sound. *L* in English is sometimes silent, as in *palm;* but it serves in such instances to modify the sound of the vowel which precedes it. For the use of *l* in French and Spanish, see PRONUNCIATION OF FOREIGN NAMES.

LABIATAE, *la bi a' tee,* the name by which botanists know the plants of the mint family. See MINT.

LABOR, AMERICAN FEDERATION OF. See LABOR ORGANIZATIONS.

LABOR, DEPARTMENT OF, the tenth executive department of the United States government, established March 4, 1913, "to develop the welfare of wage earners of the United States, to improve their working conditions and to advance their opportunities for profitable employment." In the organization of the Department a number of bureaus and divisions of what had been the Department of Commerce and Labor were transferred to it. These were the Bureau of Immigration, the Bureau of Naturalization, the Division of Information, Immigration Service at large and the Bureau of Labor, whose name was then changed to the Bureau of Labor Statistics. There was also added the Children's Bureau, a new division which had been organized in 1912 under the old Department of Commerce and Labor.

The head of the Department, the Secretary of Labor, is given power to act as mediator and to appoint commissioners of conciliation in labor disputes, wherever in his judgment the interests of industrial peace may require it to be done.

The Bureau of Labor Statistics is destined to be an important division of the government. It is charged with collecting and reporting at least once a year full and complete statistics of the conditions of labor and of the products and distribution of the products of labor; such parts of the information thus secured as the secretary may deem proper may be given to the public.

The secretary is a member of the President's Cabinet but is not eligible to succession to the Presidency. His salary is $12,000 per year. This Department came into existence on the day that Woodrow Wilson became President of the United States; President Taft signed the bill creating the Department as the last official act of his administration. See CABINET.

LABOR, DIVISION OF, the name given by political economists to the conditions which exist in modern industry under which one man performs only one function, or at most a few functions, in a long series of operations. A better word for this condition of affairs would be *coöperation,* for all the workmen are engaged in completing one thing; no one of them alone could finish it without the coöperation of the others. In the manufacture of shoes, for example, there are a dozen or more processes; the old cobbler still cuts out the leather and builds up the entire shoe piece by piece, but in the modern factory one man cuts soles, another cuts uppers, another the tongues, and in nearly every step the workman is either helped by machinery or he merely operates a machine. The division of labor is, as a matter of fact, the result of the development of the factory system and of the accompanying use of machinery (see FACTORY AND FACTORY SYSTEM).

The arguments in favor of the division of labor are easily understood. It divides a complicated process into a series of simple operations, in which the workman becomes skilful in a shorter time than if he had to learn all the other operations as well. This fact means a saving of time, and therefore a saving of money and a reduction in the cost of production. Another great advantage is the inducement to invent new machinery and the tendency to use all machinery more efficiently. While it is probably true from the point of view of the community that the division of labor means economy, it is equally true that it may harm the individual workman. It increases the latter's skill in one field, but it lessens his experience and usefulness as an all-round workman. The objection is frequently heard that the modern factory, with its minute division of labor, destroys the individuality of its workmen and makes machines of them. The movement usually called Arts and Crafts (which see) is chiefly a protest against this tendency and an attempt to restore individuality to the craftsman and his products.

LABOR DAY, a legal holiday, usually the first Monday of September, observed in all of the states of the American Union and in every province of Canada. In New Orleans it is celebrated on the fourth Saturday of November, and in North Carolina on the first Thursday of September. It is not in effect in Alaska, the Philippines or Porto Rico. The celebration of Labor Day on the first Monday of September was inaugurated by the Knights of Labor in 1882. Different organizations of workingmen then petitioned for legislation making the day a legal holiday; in 1887 Colorado passed the first law to that effect. The occasion is marked by cessation from usual labor, and by parades, meetings and addresses by prominent labor leaders.

Since the Labor Congress in Berlin in 1890, the first of May has been set aside for labor demonstrations in some European countries.

LABOR LEGISLATION, a general term referring to all laws regulating the conditions of labor and the relations of employer and employee. The great number of laws now in existence, in Canada, in the United States, in England and practically every other civilized nation are the product of little more than a century of development. They are the direct result of the introduction of the factory, and their general purpose is to protect the workman from unfair and unhealthful conditions of labor. In other words, labor legislation is designed to win for the workman rights or privileges which he is not individually strong enough to secure.

As long as the employer himself was a workman—a master workman surrounded by his artisans and apprentices—a kindly, human relationship existed between master and man. But the introduction of automatic machinery in various branches of manufacturing wrought a great change. The employer gradually became a capitalist, not a worker; he had little direct contact with the operatives, and was not intimate with their surroundings and their daily life. His chief interest in them, possibly, was to get a maximum amount of work for a minimum amount of pay. The workers were often forced to labor too long hours, sometimes under miserable working conditions.

In 1750 the relation of employer to workmen was somewhat paternalistic; by 1800 the pendulum had swung sharply in the reverse direction, and extreme individualism was the rule. By 1900 the pendulum was far back on its way to a paternal attitude, but this time it was the government, not the employer, whose duty it was to protect the workman. The first laws regulating labor in factories were passed in England in 1802, and in Germany, France and other European countries soon afterward. But the great body of labor legislation now in force is the product of the last half century. In almost all European countries labor legislation is national in its scope, and the entire field of the relation of labor and capital is a

national concern. In the United States, in Canada and in Australia, on the contrary, such legislation is mainly state or provincial in character. Under such a condition, when every state and province passes its own labor laws, there is a great variety in their provisions. In this article, therefore, it is possible only to indicate general tendencies.

Hours of Labor and Minimum Age. More than half of the states and provinces have limited the hours of labor for children and women. The earliest legislation on this subject was in England, and limited the working-day to twelve hours. Later the average was ten hours, and the tendency now is to permit women and children to work only eight hours. A few states limit the length of the working-day for men in certain specified occupations, such as work in mines and smelters, brickyards, bakeries, street railways and railroads. In September, 1916, the United States Congress passed a law establishing an eight-hour day on all railroads engaged in interstate commerce, and this legislation was upheld in the Supreme Court in March, 1917. The minimum age for child workers gradually rose from eight to twelve, and now most states have set fourteen years as the limit. Sixteen and eighteen years are the minimum in a few instances for girls and for boys in certain dangerous trades and occupations, and in several instances nobody under twenty-one years of age may be employed. It is noteworthy that shorter working-days for men have been won not by legislation but chiefly through the power of organized labor (see LABOR ORGANIZATIONS).

Protection from Sickness and Injury. Laws to protect workmen from disease or accident apply particularly to factories, but also to mining and other industries. In most states laws have been passed to protect the worker from unsanitary surroundings; many laws require so many cubic feet of air space for each person employed and the installation of fans and devices to provide fresh air and to clear stagnant air of dust and odors. Adequate fire-escapes, outward-opening doors, guards and screens for dangerous machinery are other requirements. Until recent years many of these laws were passed without proper provision for their enforcement, but now there is some form of factory inspection nearly everywhere.

A notable change has taken place in the attitude of the law towards the employer's responsibility for the health and safety of his workmen. Time was, under the common law, when the employee could not win money damages from the employer unless he could prove that the latter was personally negligent. The modern theory assumes, on the contrary, that the employer is responsible, and usually requires him, even if he was not personally negligent, to contribute to the support of the injured workman. Further details are given in the article EMPLOYERS' LIABILITY (which see).

Restrictions on Laborers. So long as workmen made individual contracts with employers, it was the former who needed protection. With the growth of powerful labor organizations, however, there came the necessity of protecting not merely the employer but also the public, if the master and workmen have a dispute. Organized labor has been responsible for many of the laws protecting the workmen, but its power has also led to laws restricting its activities. W.F.Z.

Consult King's *Canadian Method of Preventing Strikes and Lockouts;* Hatch's *Government Industrial Arbitration* (Bulletin 60 of the United States Department of Labor).

LABOR ORGANIZATIONS, societies whose purpose is to improve the situation of laboring men and women, especially by securing increased wages, shorter hours of work and better working conditions. They are broadly of two kinds—the *trade unions,* whose members all have the same occupation, and the *associations,* which admit workers of every sort.

When the first unions were formed in England in the eighteenth century, factory laborers—men, women and even small children—were working more than twelve hours a day in dark and unsanitary shops for wages scarcely sufficient to keep them alive. Every workman was almost absolutely dependent upon his employer, but the latter could easily do without any individual employee. At first unions were prohibited by law, and the members were obliged to act in secret; but they soon made themselves feared, if not respected, by their employers, who were unable to treat an organized body of men as they had treated individuals. Powerful unions arose in nearly all the civilized countries, and largely as a result of their efforts the conditions of labor have been revolutionized. The article EIGHT-HOUR DAY explains one of the reforms obtained.

A frequent criticism of trade unions is that they have become as arbitrary on their part as they claim many of the employers to be. Thus they not only oppose the hiring of non-union labor, but one trade strictly confines

another trade to the latter's own business. For example, a bricklayer is forbidden to drive a nail, and a carpenter must not handle a trowel. Such narrow views are condemned by many of the labor organizations of the second type, those which include workers of all trades. The Knights of Labor, which in about the year 1885 was the strongest labor organization in America, is said to have declined in power because of its opposition to the unions, and leadership is now held by the American Federation of Labor, an association formed by hundreds of local trade unions in the United States and Canada.

The policy of the unions in demanding an equal wage for all, regardless of their comparative ability, is sometimes objected to on the ground that it gives no encouragement to conscientious and skilful work. On the other hand it seems plain that the receipt of good wages by comparatively inefficient workmen has enabled them so to improve their conditions of living that they and their children have become more efficient than were any laborers under former wage systems. It is well known that in many countries where uniform high wages are paid, manufacturing is really cheaper than elsewhere, both because of the increased value of the men and because of the stimulus to inventing labor-saving devices.

In England labor organizations became active after the law against them was repealed in 1824. The trade unions were responsible for many strikes accompanied by violence, and many workmen preferred to belong to socialistic societies. In 1864 an organization, called the International Workingmen's Association, was formed by French and British laboring men; it soon drifted into socialistic control, and eventually split into two rival societies. It opposed war and held the duty of a workman to his fellows to be above national allegiance. An international organization of today advocates the same principles, but proved to be powerless at the outbreak of the War of the Nations in 1914.

Workingmen's associations gained importance in the second quarter of the nineteenth century. The first large federation was the National Typographical Union, later called *International,* to include Canadian members. Since the decline of the Knights of Labor and the rise of the American Federation of Labor, the most important development has been the organization of the Industrial Workers of the World, familiarly called the "I. W. W.," a radical society objected to by the true leaders of labor, which demands the entire overthrow of the wage system and proclaims the right of workingmen to destroy employers' property, waste employers' time and break agreements at will. This policy is called *sabotage.* C.H.H.

Consult Lloyd's *A Country without Strikes;* Gilman's *Methods of Industrial Peace.*

Related Subjects. The following general articles and biographies of labor leaders have a bearing on this subject:

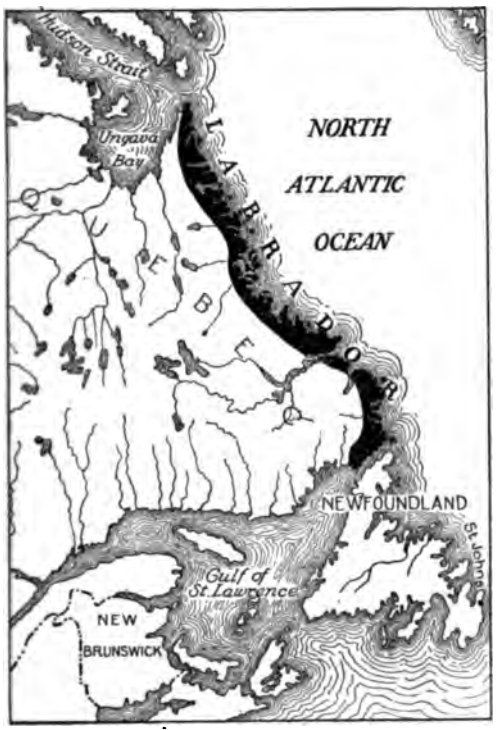
Debs, Eugene V.	Labor, Division of
Eight-Hour Day	Labor Legislation
Factory and Factory System	Mitchell, John
Gompers, Samuel	Open Shop
Knights of Labor	Sabotage
Labor Day	Strike
Labor, Department of	Syndicalism
	Wages

LABOUCHÈRE, *la boo shair',* HENRY DUPREY (1831-1912), a journalist and diplomat, born in Surrey, England. He excelled as a paragraph writer of pithy, pointed articles, and in Parliament, where he served over twenty years, he was famous for his pointed speeches, his aggressiveness as a Liberal, and his influence as a member of the Jameson Raid Commission in 1896. He was a member of the diplomatic service for ten years, serving at Washington, D. C., part of the time. He was connected with the *Daily News* as correspondent in Paris; was city editor of the *World,* and he founded and edited *Truth.* He was a vigorous advocate of Home Rule for Ireland.

LABRADOR, *lab ra dawr',* or *lab'ra dawr,* an almost trackless, icebound strip of rugged coastland, which, with its adjacent barren islands, constitutes the extreme eastern country of the British North American mainland. It is a dependency of the British colony of Newfoundland. Although Labrador was the first part of North America to be discovered by Europeans, having been visited by Norsemen in the tenth century, it is still a land of Eskimos and Indians; and although thousands of fishermen from Newfoundland, Canada and the United States visit its coast each year to carry away more than five million dollars worth of fish, little is known of the interior of Labrador with its untold wealth of natural resources.

Labrador extends from the Strait of Belle Isle northwest to Cape Chidley, at the entrance of Hudson Strait. It varies from ten to fifty miles in width and covers an area of 120,000 square miles, which is more than twice the area of the state of Georgia and almost half that of the great province of Saskatchewan.

The People and Their Surroundings. There are only about 4,000 people in Labrador, an average of one to every thirty square miles, but the population is concentrated in small,



LOCATION MAP

scattered settlements. In the barren north the people are chiefly Eskimos; in the south live Algonquian Indians, and here and there in the various settlements live a few whites. The homes of these fur-clad people are tents of skins or rude huts of stones or wood, often banked with snow and shaped like beehives. Although native dialects are still employed, English is generally spoken, and over one-third of the people belong to the Church of England. Many of the natives have been taught to read and write through the efforts of Moravian missionaries, who have stations at Nain, Okkak, Hopedale and Hebron. The Indians of the south are principally Roman Catholic. Through the heroic work of Wilfred Thomasen Grenfell, medical aid and a brighter future have been brought to Labrador's poor fisherfolk.

As the climate of the country is exceedingly cold and stormy at all times, excepting during a short summer season, the country is not adapted to agriculture. Moss and lichens are the principal forms of vegetation in the north; stunted growths of poplar, pine, birch and willow are found in the south. Fronting the Atlantic, Labrador presents a wall of rocky cliffs from 1,000 to 6,000 feet high, which are cut into numerous bays and fiords matching the Norway coast in beauty. The northern lights appear with brilliant frequency.

Labrador streams are rich in excellent food fish, which, with the cod and salmon fisheries of the coast, furnish summer occupations resulting in great wealth to Newfoundland. Valuable fur-bearing animals abound, and the trapping of silver, red and white foxes, marten, lynx, otter, mink, beaver and bears is the principal winter occupation. Caribou of the interior, and seals of the coast, are the principal sources of animal food to the inhabitants. Dogs and reindeer are the only domesticated animals, and both are used to draw sledges, the sole means of land conveyance. Canoes traverse the waters for hundreds of miles. Eagles, hawks, white grouse and numerous varieties of waterfowl are plentiful. Mosquitoes are as numerous and troublesome during their brief season in this land of almost continuous Arctic weather as in southern climates. The mineral resources of Labrador are practically untouched, but large deposits of iron and labradorite exist.

Government. Labrador is under the jurisdiction of the Newfoundland government, which is administered by a governor, assisted by an executive council, a legislative council and a house of assembly.

History. In the tenth century, Leif, the Norseman, discovered the Labrador coast, but no explorations were made. It was again discovered in 1497 by John Cabot. Explorations and settlements were made, and the name Labrador was given to the entire peninsula, which is now almost entirely a part of Canada's province of Quebec. It is believed that this peninsula was called Labrador because Portuguese explorers thought the natives would make good laborers, or slaves. Until 1840 the section was practically unexplored; then officers of the Hudson's Bay Company traversed the interior. The coast strip now constituting Labrador proper has changed ownership several times, and the exact boundaries were long disputed by Newfoundland and the Dominion of Canada. Continuous enmity exists between the Indians of the south and the Eskimos of the north. R.MC F.

Consult Grenfell's *Labrador, the Country and the People;* Dwight's *Children of Labrador.*

Related Subjects. The reader is referred to the following articles in these volumes:

Algonquian Indians	Eskimo
Aurora Borealis	Grenfell, Wilfred T.
Cabot, John	Newfoundland

LABRADOR CURRENT, a cold ocean current, flowing from the Arctic Ocean along the shores of Labrador to a point near Newfoundland, where it meets the Gulf Stream. The influence of so considerable a body of icy water

LABRADOR CURRENT

The downward-pointing arrows indicate the general course of the Labrador Current. The arrows pointing in a northeasterly direction show the course of the Gulf Stream.

is felt as far south as New England. The harbors of Labrador are blocked with ice for about half of each year, whereas those of the British Isles, situated in the same latitude, are open to commerce throughout the year. The difference is largely one of ocean currents, Great Britain being warmer because of the influence of the Gulf Stream. The Labrador Current is a considerable inconvenience to shipping. The cold current has a chilling effect on the air, condenses the moisture and gives rise to the heavy fogs off the shores of Labrador and Newfoundland—fogs through which ships have to feel their way with great caution to avoid collisions with other craft or with icebergs.

LABRADORITE, *lab'ra-dor'ite,* or **LABRADOR SPAR,** so named from the region where it was discovered, is an ornamental stone used for decorative purposes because of its fine play of color—blue, green, orange, purple and red. The name is also applied to a species of fine building stone imported from Norway, and is used by some geologists as the name of a rock group containing much augite. Labradorite is generally dull gray in color but is susceptible of a fine polish. The comparatively-rare iridescent variety is much used in inlaid work.

LABRADOR TEA, a small evergreen plant belonging to the heath family, which grows in swamps in Greenland, Northern Europe and the northern part of North America. The leaves are tough, with a woolly brown covering on the underside, and when bruised are very fragrant. They are dried and used as a substitute for tea in Labrador, as suggested by the popular name of the plant. Botanists call it *ledum,* a word derived from the same root as *laudanum.* The leaves of the plant have narcotic properties and are sometimes used as a substitute for hops in the manufacture of beer. They also possess tannin, which makes them of value in the preparation of certain kinds of leather.

LABUR'NUM, an ornamental tree, of the pea family, prized on account of its bright yellow blossoms and glossy foliage, which remains green until late in the fall. It is sometimes called *bean trefoil tree,* or *golden-chain.* All parts of the tree, particularly the seeds, are poisonous, and insects never molest it. The English laburnum sometimes grows to a height of forty feet, but averages about twenty feet. In the United States it thrives as far north as Massachusetts. The large species yield a very fine-grained, hard wood, which can be polished and is used for turning, cabinet work, inlaying, etc. The poisonous substance contained in the seeds of the laburnum is called *cytisine.*

LABYRINTH, *lab'i-rinth.* One of the best known of all legends is the story of Theseus, who with six other Greek youths and seven maidens was sent into the Cretan labyrinth to face the terrible minotaur. He killed the monster, but would have been unable to find his way out of the innumerable twisting passages of the labyrinth had not Ariadne given him a skein of thread to unwind as he entered. Until within the present generation it has been supposed that the story was entirely fanciful, and the idea of the labyrinth suggested by a cave on the mountain side near Cnossus, the ancient home of the Cretan kings. Now, however, the remarkable excavations conducted since 1900 by Sir Arthur Evans have established the probability that the legend is founded on events which actually took place. At Cnossus has been uncovered a marvelous palace truly labyrinthic in its intricacies. On its walls

are pictures of boys and girls, presumably captives trained in their art, vaulting onto the back of a charging bull, and beneath the palace have been found dungeons in which the toreadors may have been kept. On walls and pillars are frequent markings of a religious symbol shaped like a double axe and called *labrys;* undoubtedly the palace was the center of the worship which the labrys typifies, and so came to be called labyrinth.

The great labyrinth of Egypt, which Herodotus considered more marvelous than the Pyramids, was long ago torn to pieces, but its site can still be traced. It was perhaps built in emulation of the Cretan labyrinth.

A structure with an ingenious and confusing network of passages is often seen in amusement parks. A modern labyrinth of this nature is usually called a *maze;* it is designed to furnish amusement to those who like to try their skill at finding their way through a series of complicated, winding pathways. Games for boys and girls, based on the same principle, are also popular. The accompanying picture shows a type of English maze.

LABYRINTH, OR MAZE

A maze of the style once popular in English gardens. The walls were green hedges. By consistently following the right-hand or the left-hand wall a person could reach the center with comparative ease.

Related Subjects. The reader is referred to the following articles in these volumes:

Ariadne	Minos
Crete	Minotaur

LAC, *lak,* from which is obtained shellac, lacquer, lac dye and the finest grades of sealing wax, is made by insects. The lac industry is centered in Assam, Bengal and Siam. In the late spring the natives hang twigs containing the lac insect's larvae (young) in fig and other trees. Spreading to all the tender branches, the insects pierce the bark to get their food. From certain pores they give out a sticky red substance which fastens most of them to the tree. Beneath the bodies imprisoned in this lac the eggs hatch into countless larvae. Several generations thus succeed each other in one season, sometimes depositing lac half an inch deep. After six months the encrusted branches are cut off and the lac is prepared for commerce. Perhaps once in four years the trees are given a rest, for, though the insects make the lac, it is of course the trees which furnish the material.

Lac is prized by the Chinese because it can be highly polished (see LACQUER WARE). When purified it becomes *shellac,* which is valued for varnish because light penetrates it and shows the grain of the wood beneath. The best shellac is a light orange-brown; if all the impurities are not removed it is darker. Pulling and twisting makes it opaque, suitable for sealing wax. From the coloring matter which is strained out comes a beautiful purple dye.

LACCADIVE, *lak'a dive,* **ISLANDS,** a group of thirteen islands and coral reefs in the Indian Ocean, near the southwestern extremity of India, eight of which are inhabited. They are politically attached to British India and are populated by a Mohammedan race of mixed Arab and Hindu descent. The islands occupy an area of about eighty square miles, and lie so low in the sea that they would hardly be seen but for their cocoanut groves. The chief products are copra and cocoanut fiber, though in some parts, where the overlying coral has been removed, pulse, vegetables and bananas are grown.

The islanders are daring sailors; the commerce is conducted almost entirely in native boats, the surrounding reefs making navigation dangerous for ocean vessels. Rice, the principal food of the islanders, is imported. The women manufacture coir, from which matting is made (see COCOANUT), while the men devote themselves to boat building and trading with the mainland. The population is about 10,300.

The Laccadive Islands are in almost every respect similar to the Maldive group, farther south.

LACE, a delicate and ornamental network usually made of linen or cotton threads, but sometimes of silk. The word received its

present application in the sixteenth century; before this it was descriptive of the cord used to lace articles of clothing, and of gold and other fancy braids used for trimming. The most ancient specimens of lace in existence are the hair and breast nets found in Egyptian tombs, which date as far back as 2500 B.C. There are two distinct classes of hand-made lace, each of which contains many varieties; these are *needle-point* lace, and *bobbin,* or *pillow,* lace. A great deal of lace is now made by machinery, but this, of course, cannot be compared to the exquisitely designed and delicately beautiful hand-made varieties.

Needle-Point Lace. In the *needle-point process* a needle and a single thread are employed, and the work is developed mesh by mesh, each mesh being completed before the next is begun. Under this head are included Guipure, Venetian point, the French laces of Alençon and Argentan, Brussels Rose, Portuguese and Maltese point. Brussels point differs from the Venetian and French needle laces chiefly in the use of a plain instead of a button-hole stitch. Spanish point was at one time very popular, but the industry declined owing to the large quantities of Flemish lace imported into Spain. Specimens of this lace produced by Spanish convents in the early part of the nineteenth century were similar to Venetian point. Point d'Angleterre is another name for Flemish lace. In the oldest forms of point lace there was a foundation of fine linen, with a network of threads attached to a light frame, the patterns being worked with the button-hole stitch upon these threads and into the linen foundation. When the work was completed, the foundation was entirely hidden by the design. The foundation outside the pattern was then cut away, and the designs joined together by threads.

The Bobbin, or Pillow Process. This form of lace is said to have been invented in 1561. This variety of lace is made by working the design over a parchment pattern upon a cushion or pillow, the threads being wound upon bobbins. The figure is then made by looping the threads around the pins to form the open-work or net part of this form of lace. Among the more important bobbin laces are Brussels (both Saxony and Flemish), Mechlin, Lille, Chantilly, Valenciennes, Honiton and Irish lace. The Mechlin laces are made in Mechlin, Antwerp and Lierre. Ordinary Mechlin and Brussels pillow laces are made with a hexagonal mesh. The Lille laces are of a simple pattern, outlined by a thick thread. The Chantilly laces are also of simple construction, and are highly regarded, especially in black. Valenciennes was probably the most important pillow lace manufactured in Belgium prior to the German invasion in 1914, and that made at Ypres was of a particularly fine quality. Its chief characteristics are elegance of design, beauty of background and uniformity of tissue. The mesh, which is diamond-shaped and closely plaited, is without twisted sides.

Honiton is the best known and the most beautiful of the English pillow laces. It is, to some extent, similar to Brussels, but has more individuality. The beautiful Irish lace is made at Limerick, and is highly valued. The lace industry of Russia is said to have developed in the seventeenth century after a visit of Peter the Great to Paris, and the Russian varieties are therefore of French origin.

Machine-Made Laces. The various kinds of manufactured lace are largely made from cotton, although a fiber called *ramie* has been satisfactorily employed.

Nearly every kind of hand-made lace can be copied so perfectly that it is sometimes difficult to distinguish the imitations from the genuine. While the enormous output and cheapness of machine lace have brought it within reach of all classes, it is said that the demand for the hand-made varieties has not declined.

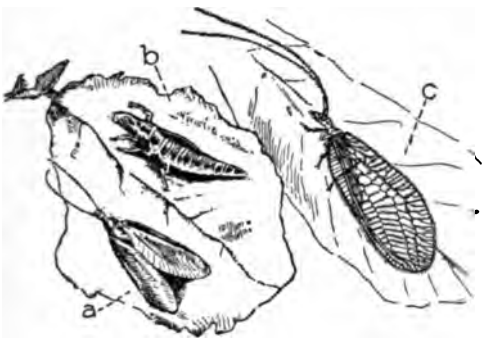
The first crude form of a lace machine was invented in 1758, and a lace was at once produced in imitation of Brussels. A really practical device was not brought out until 1809. This is said to have been suggested by machinery used in making fish nets. S.L.A.

Consult Jackson's *Hand-Made Lace;* Mincoff and Marriage's *Pillow Lace;* Jourdain's *Old Lace;* Clifford's *Lace Dictionary.*

LACE-BARK TREE, a curious tree for which the natives of the West Indies find various uses. The inner bark, made up of very strong fibers, consists of several layers, which after soaking may be easily separated into weblike sheets of "lace." This the women use for ornamental purposes, and it is said that Charles II of England was presented with a collar and frills made from it. Ropes, matting, whips and other articles are also made from the fiber and used largely in the Indies.

LACE-WINGED FLIES, a family of insects whose wings are lacelike, somewhat resembling gauze on an open-work frame. They have yellow een bodies and feed upon smaller flies

and insect eggs. Their eggs are grouped as on a stem, to protect them from worms, and the larvae (young) spin themselves a queer



LACE-WINGED FLIES

(*a*) Adult, three-fourths natural size; (*b*) the grub, about one-half size; (*c*) the adult, magnified about one and one-fourth times.

little cocoon with a lid that opens to let them out when they become flies.

LACHINE, *lah shcen',* a suburb of Montreal, in Jacques Cartier County, Quebec. It is situated on the island of Montreal and on the Saint Lawrence River, eight miles southwest of Montreal, with which it is connected by the Lachine Canal. Lachine is the eastern terminus for steamers plying between Ottawa, Kingston, Toronto and Hamilton. Railway transportation is provided by the Grand Trunk and Canadian Pacific railways, and electric lines extend to Montreal. The name La Chine (China) was given the place in 1669, in derision of the first settlers, who had hoped to reach China by way of the Saint Lawrence River. In 1689 the place was burned and the inhabitants were massacred by the Iroquois Indians. It was rebuilt and incorporated as a town in 1872 and as a city in 1909. The population is chiefly Canadian. In 1911 it was 10,699; in 1916 it was estimated at 14,000.

Though primarily a residential suburb of Montreal, Lachine is also important commercially and industrially. Through the Lachine Canal, which was constructed to avoid the Lachine Rapids in the Saint Lawrence River, the city becomes the receiving and shipping point for all the water commerce between Montreal and the West. The enormous hydro-electric power generated here by the current of the Saint Lawrence River supplies Montreal and the vicinity with power for manufacture and other purposes. The largest industrial establishments in Lachine are electric light plants, steel mills, foundries, car- and boat-building plants and breweries. A.E.S.B.

LACHLAN, *lahk'lan,* a river in New South Wales, Australia, a tributary of the Murray, which with its branches forms the only large river system of the continent. It rises in the Blue Mountains, flows southwest into the Murrumbidgee, which joins the Murray, emptying into Encounter Bay. The Lachlan is about 700 miles long and furnishes moisture to the grassy plains through which it flows and on which great numbers of sheep are raised.

LACHRYMAL, *lak'ri mal,* **GLANDS** are the tear glands leading to the eyes. The phrase is from the Latin *lacrima,* meaning *tear,* and *glans,* meaning *acorn.* The glands are two small bodies each the size of an almond, lying in the upper and outer part of the cavities which hold the eyes. They secrete fluid which is carried to the eye by eight ducts which lead to the *conjunctiva,* or the thin, fine membrane that lines the lid and from there passes over the ball of the eye. The continual motion of the eyelid effects an unnoticeable washing of the eye, freeing it of dust and foreign bodies. This fluid next passes through two small openings in the lower lids into the lachrymal canals, and down the lachrymal ducts into the lower portion of the nose. An unusual secretion of moisture, on account of irritation of the eye or through excessive emotion, overflows the lower lid as tears. J.H.K.

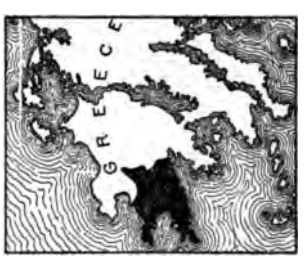
LACKAWANNA, *lak a wahn'a,* a small river rising in the northeastern part of Pennsylvania, in whose valley are found the largest and most important anthracite coal beds in the United States. It flows for about fifty miles through narrow defiles formed by the Shawnee and Moosie mountains, emptying into the north branch of the Susquehanna at Pittston. All along its banks are great rolling mills, collieries and blast furnaces.

LACKAWANNA, N. Y., a city in Erie County, noted for its steel industry. It is situated on the Lake Erie coast of the state, five miles south of Buffalo, by rail. Albany is 300 miles east, directly across the state, and New York is 450 miles southeast. The city is served by the New York Central, the Pennsylvania, the Lehigh Valley and the Buffalo, Rochester & Pittsburgh railways, and by traction lines. Lackawanna was incorporated in 1909, when it adopted the commission form of government. The inhabitants are chiefly Americans, with a mixture of Poles, Irish and Hungarians; the population increased from 14,549 in 1910 to 16,346 in 1915 (state census). The area of the city is four square miles.

Besides steel plants, which employ from 8,000 to 10,000 men, the city has extensive bridge works, coking plants and blast furnaces. The noteworthy buildings are those of Saint Joseph's Orphan Asylum, Saint John's Protectory, Moses Taylor Hospital, the city hall and the high school. South Park is a feature of interest. G.R.M.

LACOMBE, *la kohm',* a town in Alberta, in the south-central part of the province. It is on the Calgary-Edmonton branch of the Canadian Pacific Railway, eighty-one miles south of Edmonton, thirty-eight miles south of Wetaskiwin and 113 miles north of Calgary, and is also the western terminus of the Moose Jaw-Lacombe branch. Lacombe is the center of a rich agricultural district, a fact indicated by the grain elevators, flour mills, creamery and farm implement distributors, which are its chief commercial establishments. It has a Dominion experimental farm, and is the seat of Alberta Industrial College, with nearly 300 students. On Gull Lake, a popular summer resort eight miles north of Lacombe, are several hotels and many summer cottages. Population in 1911, 1,029; in 1916, about 1,800.

LACONIA, *la ko'ni a,* in ancient times the most important division of Southern Greece, or the Peloponnesus, famed as the country of the Spartans. It lay in the extreme southern part of the Peloponnesus, and was bounded on the west by Messenia and on the north by Arcadia and Argolis. Its eastern and southern shores were washed by the Mediterranean Sea. Through its central part extended the deep valley of the Eurotas River, which gave to this region the name "Hollow Lacedaemon." Sparta, capital city of Laconia, was situated in the western part. In the Homeric poems Laconia is described as the realm of Menelaus, husband of the beautiful Helen of Troy. For the history of the country, see the article SPARTA.



LACONIA

Modern Laconia is a political division of Greece, having a population of about 62,000.

LACONIA, N. H., the county seat of Belknap County, is a summer resort and manufacturing city in the mountainous lake region of the central part of the state. Mount Belknap, one of the White Mountains, is six miles distant. The city is built along both banks of the Winnepesaukee River between Lake Winnesquam to the southwest and Lake Winnepesaukee, northwest. Concord is twenty-seven miles south and west and Boston is 103 miles south. The city is served by two branches of the Boston & Maine Railroad and by an electric line to the Weirs, and is a port for pleasure boats and timber rafts on the lakes. The area of the city is fifteen square miles. The population, which is nearly fifty per cent French Canadian, was 10,183 in 1910 and 11,528 in 1916, by Federal estimate.

The cool climate, beautiful lake and mountain scenery and opportunities for fishing and boating attract many people in the summer. Opechee and several other small parks and an athletic field are places of interest. The public institutions include the Gale Memorial library, the state school for feeble-minded children and a home for the aged. The New Hampshire state fish hatchery is located here. The construction of a Federal building was begun in 1916.

Good water power has attracted a number of large manufactories. The Laconia Car Company employs nearly 1,200 men; the producing capacity is one passenger car a day and one freight car an hour. There is an extensive lumber business. More than 4,000 pairs of hosiery are produced daily by the city's hosiery mills. Other manufactured products are yarn, knitting machines, needles, sashes and blinds, axles, paper boxes and gas and gasoline engines.

A group of English people from the southern part of New Hampshire settled Laconia in 1780-1782. The place was incorporated in 1852 and chartered as a city in 1893. F.H.

LACQUER, *lak'er,* **WARE,** a beautiful product from the Far East, is made by application of many successive coats of a varnish called lacquer to any object from a match box to a bridge. In Japan *lacquer* is the sap of the *urushi* tree; in China and other countries it is generally *lac* (which see). The Japanese, who excel in the brilliancy, beauty of design and durability of their ware, learned the art from the Chinese, probably in the sixth century. A piece of Japanese lacquer ware has perhaps thirty-five thin coatings of black lacquer, each dried and highly polished before the application of the next, on a foundation of wood sometimes as thin as paper. The decorators draw their pictures with powders of

gold, silver and colors, and cover them with a protecting coat of transparent lacquer.

The best work is exceedingly artistic, and so durable that a lacquered door may be in daily use for centuries without deterioration. A collection of lacquer ware which had been exhibited at the Vienna exhibition of 1873 was recovered from a sunken ship; the ancient articles, more carefully made than the modern, were unharmed. Like painting, lacquer ware is often extremely valuable for its artistic excellence.

LACROSSE, *la kross'*, the national game of Canada, taken over from the Indian tribes of the North. As originally played by the Indians it was a truly Homeric game; the warriors of two tribes contended in full war paint, and as many as 1,000 players are said to have participated.

Lacrosse as it is played to-day is not unlike football, the object being to carry or drive a small India rubber sphere between the enemy's goal posts. The *crosse,* with which the ball is driven or carried down the field, is formed of a pliable hickory staff bent into a hook at the top to serve as a frame for a network of rawhide or gut, not unlike a tennis racket but much longer. The goals are set up at a distance of from 100 to 150 yards apart, the goal posts being six feet high and the same distance apart. Each side, consisting of twelve players, struggles to send the ball through the enemy's goal posts as often as possible in the two periods of play. The ball itself may be kicked or driven with the crosse, but long drives are rather infrequent, the ball being advanced most commonly on the crosse and passed from player to player. Canada has a National Lacrosse Association, founded in 1867, and several colleges of the United States have organized a league of lacrosse clubs.

Books containing the rules of this game may be purchased at any stationer's shop for from ten to twenty-five cents. W.C.

LA CROSSE, Wis., an important manufacturing city, the center of a prosperous dairy and stock-raising section, and the county seat of La Crosse County. It is situated on the southwest border of the state, on the Mississippi River at the point where it receives the waters of the Black and La Crosse rivers. Five railway lines serve the city—the Chicago, Milwaukee & Saint Paul, the Chicago & North Western, the Chicago, Burlington & Quincy, the Green Bay & Western and the La Crosse & South Eastern. These with the river afford admirable transportation facilities. A fine wagon bridge spans the Mississippi. In 1910 the population was 30,417; it had increased to 31,677 in 1916 (Federal estimate). The area of the city is nine and one-half square miles.

La Crosse lies in a region along the Mississippi River noted for beautiful scenery; here the bluffs rise to a height of 600 feet above the river. The Black River, from the great forests of the north, mingles here with the "Father of Waters." The valley of the La Crosse River is an outlet for commerce to the east, and the Root River, which enters the Mississippi from the west, just below the city, makes the fertile sections of Lower Minnesota and Northern Iowa easily accessible.

La Crosse is an important tobacco market, and has a large wholesale trade; the annual output of its lumber mills is about 300,000,000 feet of sawed lumber. In addition, there are large rubber mills employing 625 people and making 13,000 pairs of shoes daily; pearl-button works, plow works, flour mills, gasoline-engine works, cracker factories, candy factories, knitting mills, garment factories and a great variety of other manufactories. The city also ships large quantities of seeds.

Among the notable buildings are a $100,000 Federal building, a state normal school which cost $250,000, a $200,000 high school, a $125,000 manual training school and a large public library containing 25,000 volumes, the gift of ex-Governor Washburn. A United States weather bureau and a United States fish station are located here. La Crosse is the see of a Roman Catholic archbishop. There are four parks, one of which, Pettibone Park, is on an island in the Mississippi River.

The site of La Crosse was visited by Father Hennepin as early as 1680, but a permanent settlement was not made until 1841. It was incorporated as a village in 1851 and as a city in 1856. A revised charter was granted in 1891. The site was known as Prairie La Crosse, from the Indian custom of meeting there to play the game of lacrosse. C.S.V.A.

LACTEALS, *lak'te alz* (from the Latin *lacteus,* meaning *milky*), is the name applied to numerous tiny vessels of the small intestines, whose function is to convey the milklike fluid called chyle (which see), during the process of digestion, to the blood. The lacteals originate in small projections of the mucous membrane of the intestines, the *villi,* each of which has its own lacteal vessel or network of vessels. The lacteals communicate with larger branches

located in the outer coats of the intestine, uniting finally to form large trunks which end in the *thoracic duct*. The latter tube runs upward close to the backbone and communicates with the left subclavian vein. Through this duct and the subclavian vein the nutritive food material contained in the chyle is carried from the lacteals into the general circulation. See THORACIC DUCT; DIGESTION. J.H.K.

LACTIC, ACID, from the Latin *lac,* meaning *milk,* is the name applied to several acids containing carbon, hydrogen and oxygen, the most important of which, ordinary lactic acid, is the characteristic ingredient of sour milk. It is this acid which is developed in cream when it is "ripened" in preparation for churning (see BUTTER). In a pure state it has the form of a transparent, colorless, syruplike liquid, and is a product of fermentation (which see). In the body it is found in the stomach and intestines and in the brain and muscles. A watery solution containing seventy-five per cent of lactic acid is a well-known drug, sometimes used in dissolving the membrane in cases of diphtheria, and in the treatment of stomach disorders. *Sarcolactic acid,* a substance having the same chemical composition as ordinary lactic acid, is found in the blood and is an important constituent of muscular tissue.

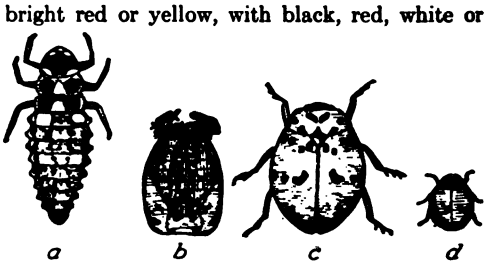
LADING, *laid'ing,* BILL OF. See BILL OF LADING.

LADOGA, *lah'doh ga,* Europe's largest lake, situated in Northwestern Russia, forty miles east of Petrograd. It is 7,000 square miles in area, or nearly one-fourth as large as Lake Superior. It is the terminal point of the system of waters which connects the Caspian Sea with the Gulf of Finland; this makes Lake Ladoga important from the standpoint of navigation. As it is dangerous for small craft on account of its rocks and shallows, several canals have been constructed along its southern and southeastern shores, upon which thousands of vessels sail each year. Its waters abound in fish. The chief towns upon its shores are Schlüsselburg, a celebrated fortress, and Novaya Ladoga, at the mouth of the Volkhov River.

LADRONE, ISLANDS, a group of sixteen islands in the North Pacific Ocean. They lie east of the Philippines and the Carolina Islands, and were discovered by Magellan in 1521, who named them Ladrones, the Spanish word meaning *robbers,* because of the thievish habits of the natives. In the seventeenth century Jesuit missionaries named them Mariana, in honor of the Queen of Spain, but the first name has been retained by geographers. Eight of the islands are inhabited, the bulk of the population being of Filipino extraction. The area of the entire group is about 420 square miles, one-third that of the state of Rhode Island. Rice, sugar, maize, coffee and tobacco are cultivated; breadfruit and cocoanut trees are native to the soil. There are few animals of any description on the islands. The climate is humid, but warm and healthful.

Guam, the largest of the islands, belongs to the United States; the others were sold by Spain to Germany in 1899. The population of the German group is less than 3,000. During the War of the Nations (which see) the Ladrone Islands were occupied by the Japanese. See GUAM.

LADYBIRD, *la'di bird,* the name applied to a large family of little beetles because of their shapely bodies and attractive coloring. These beetles are rounded or convex in form and often bright red or yellow, with black, red, white or



THE LADYBIRD

(*a*) Larva; (*b*) pupa; (*c*) adult insect. These are much enlarged. (*d*) Full-grown ladybird, only slightly enlarged.

yellow spots. The ladybirds feed chiefly on plant lice and scale insects, for the destruction of which they are highly regarded by fruit-growers.

LADYSMITH, *la'di smith,* a town of Northern Natal, South Africa, the scene of a memorable siege during the South African War. It is the third largest town in the district, and is on the Klip River, at the junction of two railways, 322 miles southeast of Pretoria. Ladysmith was founded in 1851 and named after Lady Smith, wife of Sir Henry Smith, then governor of Cape Colony. In 1848 a party of Dutch farmers who had assembled for the purpose of driving across the Drakensberg Mountains had their camp on the site of the town and were induced by the governor to remain. The growth of the settlement increased with the opening of the railroad from Durban in 1885 and its subsequent extension to Johannesburg. In the Boer War, in 1899, Ladysmith was the

center of the struggle, 9,000 British troops under Sir George White sustaining a siege of 118 days, until relieved by General Buller on February 28, 1900. The town has railway shops, electric lights, schools and churches. It is the capital of the district of Ladysmith. Population, 1911, 5,340.

LADYSMITH, a city in British Columbia, on the east shore of Vancouver Island. It is on the Esquimalt & Nanaimo Railway (now part of the Canadian Pacific system), fifty-eight miles northwest of Victoria and fourteen miles south of Nanaimo. The Canadian Pacific operates a ferry for freight trains between Vancouver, on the mainland, and Ladysmith. A large copper smelter, shingle mill, boat-building plant and aërated water works are the principal industrial establishments. Oyster cultivation is an important pursuit, and there are large coal mines near by. Ladysmith has had a rapid growth since 1901, when its population was only 700; in 1911 it was 3,295, and in 1916 about 3,800.

LADY'S SLIPPER, a group of beautiful plants belonging to the orchid family, whose name has been given them because of the large, inflated lip of the corolla, which bears a curious resemblance to a slipper. They are found throughout the temperate regions of the world, except in Africa and Australia. About ten species have been identified in North America. Among these are the *moccasin flower,* or *pink lady's slipper,* the *yellow moccasin flower,* and the *showy lady's slipper,* whose inflated white lip is marked with purplish pink or crimson stripes. See ORCHID.

THE LADY'S SLIPPER

LA FARGE, *la fahrzh',* JOHN (1835-1910), an American painter who worked with equal success in oil, water colors, on wood and on glass. His subjects included flowers, religious themes, portraits and landscapes. He was born in New York City and studied in Paris. After the completion of the mural decorations for Trinity Church, Boston, he turned his attention to glass-painting and window-designing. Together with Saint Gaudens he designed the King sepulchral monument at Newport, R. I. He executed glass church windows and decorated many churches in various large American cities. A notable example of his work in mural decoration may be seen in the Minnesota State Capitol, Saint Paul.

His finest work is the large altarpiece in the Church of the Ascension, New York City, executed in 1887. *The Arrival of the Magi* is one of his best-known paintings. His trip to Japan and the islands of the Pacific Ocean resulted in the completion of innumerable water-color sketches of native life and scenes. La Farge wrote many valuable articles on art for the leading periodicals. His greatest contributions to art outside of his mural paintings were his successful experiments in glass-cutting, painting and designing. In certain phases of this work he has not been surpassed.

LAFAYETTE, *lah fa yet',* IND., the county seat of Tippecanoe County, seventy-four miles by rail northwest of Indianapolis, in the northwestern part of the state. It is on the Wabash River and on the Cleveland, Cincinnati, Chicago & Saint Louis, the Lake Erie & Western, the Chicago, Indianapolis & Louisville and the Wabash railroads. The city has electric interurban service. In 1910 the population was 20,018; in 1916 it was 21,286 (Federal estimate). The area of the city is six and one-half square miles.

Lafayette is in the valley of the Wabash River, somewhat below the level of the surrounding plains. It is the seat of Purdue University (which see), and has a county courthouse, city hall, public library, high school, Wabash Valley Sanitarium (Seventh Day Adventist), Saint Elizabeth and Home hospitals, Saint Joseph's Orphan Asylum and the Indiana State Soldiers' Home, which provides also for the wives and widows of soldiers.

Lafayette is the market for a rich surrounding agricultural country. It has an important horse market, pork-packing plants, foundries and machine shops, and manufactories of soap, flour, paper, strawboard, cardboard, wagons and farming implements, automobile accessories and electric meters and transformers.

The present city is five miles northeast of the site of the old Miami Indian village, Oniatanon, where the French built a fort in 1720. This was probably the first military post established in Indiana. About seven miles north of the city the Indians were defeated by General Harrison in the famous Battle of Tippecanoe. The battleground is marked by a fine granite shaft, and is now the property of the state. Lafayette was settled in 1820, and was incorporated in 1854.

LAFAYETTE, MARIE JEAN PAUL YVES ROCH GILBERT DU MOTIER, Marquis de (1757-1834), a famous French soldier and statesman, who holds in the affections of the American people a place as high as do the heroes of their own country. He was born in the castle of Chavagnac, in Auvergne, September 6, 1757, and was left an orphan in possession of large estates, when but thirteen years of age. When seventeen years old he married and entered the army,

MARQUIS DE LAFAYETTE

and three years later, fired by youthful enthusiasm for the new republic proclaimed in America, set out with eleven companions in a ship fitted out by himself, to offer his services to the colonists.

A Youthful Major-General. He was at once made a major-general in the American Revolutionary army, and in spite of his youth, soon became one of the most efficient members of Washington's staff. At no time did he command a large force, but in every position in which he was placed he showed great courage and developed unusual military skill. At Brandywine, at Barren Hill and under Lee at Monmouth (see MONMOUTH, BATTLE OF) he won well-deserved praise, but in 1779 felt compelled to return to France, for against his own country England had declared war.

After performing notable service at home for the colonists by enlisting French sympathy, securing reënforcements of soldiers and financial assistance, he returned in May, 1780, to America. He was a member of the court of officers who tried Major Andre (see ANDRE, JOHN) and condemned him to death. His most distinguished military service was against Benedict Arnold in Virginia in 1781, and in the campaigns against Cornwallis, which led up to the decisive battle of Yorktown. For his part in the victory of Yorktown, which practically decided the war, he received the public thanks of his great commander-in-chief. See REVOLUTIONARY WAR IN AMERICA.

Later Visits to America. Lafayette revisited America twice, in 1784 and again in 1824-1825, and both times was received with the most cordial enthusiasm and affection. The latter visit was, in fact, in the nature of a triumphal progress, for Lafayette's firm support of democratic principles in France had increased the esteem in which he was held in America. Congress voted him a grant of $200,000 and a township of land in Florida. He was sent home on a new vessel named the *Brandywine,* in memory of the first battle in which he distinguished himself in America. During the years that have since passed twenty-three cities and towns in the United States, besides many counties, have been named in his honor.

A Reformer at Home. On his return to France in 1782 Lafayette at once showed his desire for reform. In 1787 he was called to the Assembly of Notables, and he took a prominent part in the calling of the States-General and its transformation into the National Assembly. In that body he presented a declaration of rights based on the Declaration of Independence of the American colonies. After the Bastille (which see) had fallen he was made commander-in-chief of the National Guard, which he did much to organize on an efficient basis. It was he who proposed the tricolor cockade, and he who saved the lives of the king and queen, Louis XVI and Marie Antoinette, at the time of the attack on Versailles. See FRENCH REVOLUTION.

Influence Lost and Regained. But the period of his great influence was passing, for he managed to satisfy neither party. His demand for order and moderation angered the radicals; his republican zeal won him the hatred of the Royalist party, and at times his life was in danger. When war was declared against Austria and Prussia he was placed in command of an army on the frontier, but in August, 1792, the Jacobins (which see) sent messengers to remove him from his command and arrest him. Escaping from these, he fell into the hands of the Austrians, who held him prisoner for five years. Napoleon Bonaparte (see NAPOLEON I) procured his release, but Lafayette did not favor the ambitions of the

first consul, during whose period of rule he lived in retirement.

In 1815, when Napoleon was sent to Saint Helena, the monarchy was restored and Lafayette took his place in the Chamber of Deputies, where he was always on the side of the Liberalists. The revolution of 1830 enlisted his sympathy; he was one of its chief promoters and acted again as commander-in-chief of the National Guard.

Estimate of His Character. Lafayette is one of the popular heroes for whom no apologies are needed, for in all his long public life he said and did nothing which could stain his reputation. Brave, disinterested in his motives, devoted to liberal ideals to the point of sacrificing his fortune to them, he escaped even the unjust reproach which so many good men have been forced to bear. A.MC C.

Consult Tower's *The Marquis de Lafayette in the American Revolution;* Tuckerman's *Life of Lafayette.* Women readers will be interested, also, in Crawford's *The Wife of Lafayette.*

LA FOLLETTE, *la fol'et,* ROBERT MARION (1855-), an American political leader, one of the most conspicuous figures in the group of men who have fought for political progress in government in the United States. In Wisconsin, his native state, he led the fight for reform, and made the words "Wisconsin" and "progress" almost synonymous. In the United States Senate, of which he has been a member since 1905, he has been of the determined few who have refused to be bound by party traditions and have acted and spoken as they thought best. A favorite remark of his indicates his aims: "The great issue before the American people to-day is the control of their government." La Follette is a difficult man to swerve from any purpose; once his mind is made up, he fights for his opinions with a frankness and a vigor which earned for him years ago the nickname "Battling Bob."

ROBERT M. LA FOLLETTE
One of the leaders in the American Congress, with much "advanced" legislation to his credit.

He was born at Primrose, Wis., and was left fatherless when only a few months old. As a boy and young man he bore the burden of supporting his family, and at the same time succeeded in earning enough to pay for his own education, and he was graduated from the University of Wisconsin in 1879. In the year following he was admitted to the bar, at once opened his own office, and before the end of the year had been elected district attorney of Dane County. His success was due partly to a personal canvass of his district, and partly to his skill in raising a distinct issue for his campaign.

After four years as district attorney he was elected to the national House of Representatives. When he took his seat in 1885 he was the youngest member of the House, but he soon won recognition, not only as a speaker but as a hard worker on committees. He served in the House for six years, and during his last term, as a member of the Committee on Ways and Means, had an important part in framing the McKinley Bill of 1890, a high-protective tariff measure.

At the election of 1890 La Follette's constituents showed their disapproval of his activities by defeating him. Then for ten years he practiced law at Madison, but continued to take an active part in Republican politics. About the year 1895 he was becoming recognized as the leader of a group of Republicans who were in revolt against existing political conditions as shown in local state rule. Against those controlling affairs La Follette took up the fight with characteristic vigor. His ideas on reform were outlined in two pamphlets written in 1897—one called *The Menace of the Machine;* the other, *The Nomination of Candidates by Australian Ballot.* La Follette's followers were called the "Half-Breeds;" the opposing Republicans were the "Stalwarts." Finally, in 1900, the "Half-Breeds" succeeded in electing La Follette as governor.

His inauguration was the beginning of an era of progress which made Wisconsin for more than a decade the model for political reform. Most of the "advanced" legislation was urged by La Follette, and was literally forced upon his opponents. Direct primaries, equalization of taxation, control of railroad rates and publicity for campaign expenditures are a few examples of the reforms he achieved. He was twice reëlected, but at the beginning of his third term, in January, 1905, he resigned the governorship to become United States Senator, an office to which he was reëlected in 1911 and in 1917.

In spreading his ideas and urging others to adopt them La Follette has used every legitimate means at his command. He has been a frequent speaker and has reached multitudes through his Chautauqua addresses. In 1909 he established a paper, *La Follette's Weekly,* which soon won a large circulation. His prominence in Congress and before the people led to frequent mention of his name as the Republican candidate for President in 1908; in 1912 he was defeated for the nomination by President Taft, and in 1916 by Charles Evans Hughes.

When war with Germany was debated in the United States Senate in March, 1917, previous to formal declaration of hostilities, La Follette was the leader of a small group of Senators who attempted to defeat the government's war program. W.F.Z.

LA FONTAINE, *la fawN ten'*, JEAN DE (1621-1695), one of the greatest of the poets of France. He is universally known through his *Fables,* which appeared in 1668 and went through within a few years a great many editions. In 1654 he published an adaptation of the *Eunuchus* of Terence; in 1664 his *Tales* appeared, and in 1668 his *Fables* were published. He was unambitious, absent-minded, and always ready to accept the hospitality which was offered so freely in the provincial towns of France in his day. He made a great many influential friends through his verses, and they provided for him during his sojourn in Paris. He was much beloved by Molière, Boileau and Racine for his simplicity and candor and enjoyed the friendship of many clever men of Paris. He was greatly disliked by Louis XIV, however, who confirmed his nomination to the French Academy with reluctance.

LAFONTAINE, SIR LOUIS HIPPOLYTE (1807-1864), a Canadian jurist and statesman, whose name will always be linked with that of Robert Baldwin in the struggle for responsible government. Lafontaine in Lower Canada and Baldwin in the upper province bore the brunt of the struggle, and their second ministry, formed in 1848, was the first to be acknowledged responsible to a majority of the assembly. Lafontaine was a statesman of more than ordinary vision, and he ranks high among the men who laid the foundations of the Dominion. He was not eloquent as a speaker, and he spoke English, though correctly, with a pronounced French accent. Yet his keen logic and even temper enabled him to overcome in debate many a more gifted speaker.

Lafontaine was born at Boucherville, Lower Canada. Like most of the aristocrats of his day, he studied law, and practiced with such success that he was soon financially independent and able to give his entire time to public affairs. In 1830 he was returned to the Lower Canada assembly. At first a follower of Papineau, he soon became the latter's rival, and eventually succeeded him as leader of the French party. In 1838 charges of treason were made against him as an accomplice in the rebellion of 1837. The charges were baseless, the only evidence against him being an ironical letter on the absurdity of revolution. Though not convicted he withdrew to England, and later to France.

SIR LOUIS LAFONTAINE

Returning to Canada, Lafontaine was at once elected to the joint assembly after the Act of Union. As the leader of the French-Canadians he joined Robert Baldwin (which see) in forming a ministry in 1842 and again in 1848. This second ministry marks the beginning of responsible government in Canada. By nature an aristocrat and a Conservative, Lafontaine gradually drew away from the younger and more radical reformers led by George Brown, and in 1851 retired from political life. Two years later he was appointed Chief Justice for Lower Canada, a post which he filled with distinction until his death, which occurred at Montreal, on February 26, 1864. The baronetcy, which had been conferred on him in 1854, became extinct at his death.

LAGERLÖF, *lah'ger luf,* [OTTILIA LOVISA] SELMA (1858-), a Swedish novelist, and the first woman to be elected a member of the Swedish Academy, was born on the family estate in Wermland, Sweden. She was educated at Stockholm and following her graduation taught school for ten years. While she was still teaching she wrote her first novel, *The Story of Gösta Berling.* This book met with an immediate and brilliant success, and marked the decline of the morbid pessimism which had been the literary vogue in Sweden. The *Miracles of Anti-Christ,* a record of the author's travel in Italy, was published in 1897, and was even more popular than her first work. Com-

missioned in 1902 by the National Teachers' Association of Sweden to write a school textbook which would present in narrative form the folklore and geographical conditions of Sweden, Miss Lagerlöf produced *The Wonderful Adventures of Nils*, a children's classic. Her other writings include *From a Swedish Homestead*, *Invisible Links* and *The Girl From the Marsh Croft*. In 1909 Miss Lagerlöf received the Nobel prize in literature (see NOBEL PRIZES), due largely to the recognition given *The Story of Gösta Berling*. In 1915 she published *Jerusalem*, a pen picture of the Dalesman of the north country. Her popularity in America is partially due to the painstaking translations by Mrs. Velma Swanton Howard.

SELMA LAGERLÖF
One of the three leading women novelists of the twentieth century, sharing this distinction with Mrs. Humphrey Ward and Mrs. Edith Wharton.

LAGOON', from the Latin *lacuna*, meaning a *gap*, or *hollow*, is the name applied to a shallow body of water at the mouth of a river or between sand reefs and the mainland along sea and lake coasts. Occasionally the marshes formed by the gradual filling of such places with sand are called lagoons, but such use of the word is incorrect. The still water enclosed within an atoll, or coral island composed of reefs which form an irregular circle, is also called a lagoon, and the meaning has been extended to include artificial lakes and canals in parks. The city of Venice is built upon numerous small islands in a large lagoon between the mouths of the Piave and Po rivers.

LA GUAYRA, *la gwi'ra*, a South American seaport on the north coast of Venezuela, one of the leading commercial cities of the country. It is situated on a narrow strip of land between high mountains and the Caribbean Sea, and is five miles from Carácas, the capital of Venezuela. With this city it is connected by a mountain railroad, and it enjoys steamship communication with America and Europe. The manufactures of La Guayra—hats, shoes, cigars and cigarettes—are chiefly for domestic use; skins, coffee and cacao are the principal exports. Sanitary improvements have made the city a more desirable residence place than it was formerly, with its hot, unhealthful climate, and the population is now more than 12,000. A fort protects the harbor where a breakwater has recently been built, and the city proper boasts of several churches and hospitals. In the public square stands a statue of Vargas, a famous physician born in La Guayra. The city is the terminus of a cable to Curaçao and the seat of a United States consul.

LAHORE, *lah hohr'*, the largest city of the Punjab, a province in the northwestern part of British India. Lahore is the capital of the province and of the division and of the district also called Lahore. It lies on the west bank of the Ravi River, at the meeting point of several railroads. The native town covers an area of one square mile and is surrounded by a brick wall fifteen feet high. Its appearance is far from pleasant, as the streets are exceedingly narrow, unpaved and dirty; its houses are of irregular construction, but many are rendered attractive by projecting balconies and lattice windows ornamented with varieties of carved woodwork. The sordid aspect of the city is relieved by a magnificent mosque, a mausoleum, and a royal palace dating from the early Mogul period. The European quarter, which lies outside the walls on the south, dates from 1849.

Lahore has direct railroad connection with Delhi, Calcutta and Bombay. Coarse silks, cotton prints, carpets, vegetable oils and candles are important articles of manufacture. The Punjab University, one of the most popular educational institutions in India, is the most important of several schools. Population, 1911, 228,680. It is not as attractive as many other cities of India.

LAKE, a body of water surrounded by land. The distinction between a lake and a pond is not clear. A pond is a small body of water not large enough to be dignified by the name of lake, but how large a pond must be before it is a lake is a matter of opinion. The word appears to be derived from the Greek *lakkos*, meaning a *hole*, *pond* or *lake*. Scientists agree that no matter what the cause of the formation of a lake it is formed but to perish, and the life of a lake, speaking in geological terms, is limited. It may be destroyed by a change of climate, by volcanic action which changes the contour of the country, or it may shrink by apparent evaporation. Lakes which have a river outlet are destined to find that the river has gradually worn away the barrier which holds the lake waters in place.

Lakes may be caused by natural collection of water in extinct volcanoes, by rivers which deposit silt until the natural outlet to the sea is closed, by subsidence of portions of the earth, by the melting of the ice in the Glacial Period (which see) or by many other causes. They occur in all parts of the world, but are more frequent in high than in low latitudes.

Some lakes are at a considerable elevation above sea level, while others, as in the case of the Dead Sea, are many feet below that level. Lake Titicaca, in the midst of volcanic territory in South America, is 12,500 feet above the sea; the Dead Sea is 1,292 feet below sea level. Many basins of lakes have been scoured out of the rocks by glaciers. In Minnesota alone it is estimated that there are nearly 10,000 lakes due to glacial action, and Cayuga Lake (which see) in New York is another striking example of glacial scouring. In addition to the numerous lakes found in all parts of the world, there are equally numerous basins in which lakes once existed. The lakes that now exist will in time vanish, leaving basins that will be rich for cultivation.

The Great Lakes (which see) have been formed partly by glacial action and partly by the filling of river beds, causing the dammed-up waters to overflow into the surrounding valleys. Some lakes are basins in which water has accumulated, fed by rivers and mountain streams, with the surplus waters drained off by other rivers; others apparently have neither inlet nor outlet. In contrast, others have streams which bring a continual supply of water, but which have no outlet. The Great Salt Lake is a striking example of this.

Effect Upon Temperature. The presence of a large body of water, such as any one of the Great Lakes, materially modifies the weather conditions for several miles in every direction. No matter how cold the weather may become over a wide area, residents of such a lake district do not suffer from temperatures as low as do their neighbors twenty miles inland. Water practically gets no colder than 32° F., the freezing point; it therefore warms the colder surrounding air from 5° to as much as 15°. In summer a large body of water never gets as warm as the surrounding atmosphere, therefore it cools the air perceptibly.

Conditions of agriculture near large bodies of water are materially changed. The great fruit belt of Michigan is along the east shore of Lake Michigan, where the influence of the winds from over the water so modify an otherwise rigorous climate that small fruits flourish. This great fruit belt is a comparatively narrow strip along the shore extending from the southern point of the lake in Indiana northward for over 200 miles. The grape and tobacco belt in New York lies along the shores of Lake Erie and Lake Ontario, and the presence of these large bodies of water has made it possible to raise fruits of many kinds on the other shore, in Southern Ontario, where the climate would naturally be too severe. W.F.Z.

Consult Russell's *Lakes of North America*; Gilbert's *Topographic Features of Lake Shores*, in United States Geological Survey, Fifth Annual Report.

Related Subjects. The following lakes are treated in their proper alphabetical order in these volumes:

AFRICA

Albert Edward Nyanza
Albert Nyanza
Chad
Nyassa
Tanganyika
Victoria Nyanza

ASIA

Aral
Baikal
Balkash
Caspian Sea
Dead Sea
Galilee, Sea of

CANADA

Athabasca
Bras d'Or
Champlain
Erie
Great Bear
Great Lakes, The
Great Slave
Huron
Lake of the Woods
Louise
Manitoba
Memphremagog
Muskoka Lakes
Nipigon
Nipissing
Ontario
Rainy
Saint Clair
Simcoe
Superior
Winnipeg

CENTRAL AMERICA

Nicaragua

EUROPE

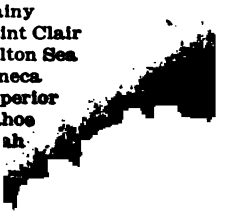
Avernus
Caspian Sea
Como
Constance
Geneva
Katrine
Killarney
Ladoga
Lomond, Loch
Lucerne, Lake of
Lugano
Maggiore,
Neuchâtel (subhead)
Onega
Zurich

SOUTH AMERICA

Maracaibo
Titicaca

UNITED STATES

Cayuga
Champlain
Erie
George
Great Lakes, The
Great Salt Lake
Huron
Lake of the Woods
Memphremagog
Michigan
Moosehead
Okechobee
Oneida
Ontario
Pontchartrain
Rainy
Saint Clair
Salton Sea
Seneca
Superior
Tahoe
Utah



LAKE CHARLES, LA., the parish seat of Calcasieu Parish, is a city in the southwestern corner of the state, forty miles from the Texas state line and thirty miles from the Gulf of Mexico. New Orleans is 218 miles east, and Houston is 160 miles west and south. Lake Charles is one of the most attractive cities in the state and is a popular winter resort; it is situated on a lake of the same name, and on the Calcasieu River. By way of the Intercoastal Canal, the city has deep-water communication, and a project is under way to deepen the river, making it navigable through the lake to the Gulf of Mexico. It is served by the Southern Pacific, the Kansas City & Southern, the Saint Louis, Iron Mountain & Southern, and the Lake Charles & Northern railroads. The area is four and a half square miles. The population in 1910 was 11,449; in 1916 it was 14,447 (Federal estimate).

A Federal building, completed in 1912 at a cost of $200,000, the parish courthouse, which cost $75,000, the city hall, Masonic Temple, the Roman Catholic church and convent, Yacht and Country Club, Carnegie Library and a private sanitarium are prominent buildings.

North of the city are large forests of valuable timber, long-leaf pine, oak, ash, magnolia, cypress and other varieties. Ten miles west are extensive sulphur mines, which, with the sulphur mines of Sicily, produce the greater part of the world's supply of that commodity. The surrounding country is the largest rice-producing section in the United States. Oranges, grapefruit and all kinds of garden vegetables are sent to city markets. The industrial enterprises of the city, whose aggregate weekly pay roll is $200,000, include eight huge saw mills, rice mills, fence factories, brick plants, a shipbuilding plant and an ice factory.

Lake Charles was settled about 1852, and in 1857 was incorporated under the name Charleston. Under the name of Lake Charles it was again incorporated in 1867 and chartered as a city in 1886. The commission form of government was adopted in 1913, providing for three commissioners. H.B.B.

LAKE DWELLINGS, habitations placed on platforms supported by piles or other foundations, within the margins of lakes or creeks at some distance from the shore. The name is generally applied to the prehistoric dwellings of which numerous remains have been found in the lakes of Switzerland and other parts of Southern Europe. These remains first became known to archaeologists in 1853 and 1854, when the discoveries were made in a lake near Zurich, although mention of a lake-dwelling community in Macedonia occurs in the writings of Herodotus, a historian of the fourth century B. C.

Discoveries led to the belief that some of these curious villages were constructed during the Stone Age (which see); that others were built after iron came into general use, and that about 4,000 years must have elapsed between the building of the first and the last of those now unearthed. Remains of various grains and some fruits, as well as bits of pottery, have been found. In Scotland and Ireland, where such communities also were numerous, they are known as Crannogs, from the Celtic word *crann,* meaning a tree. The latter, however, were not constructed like the Swiss pile villages, but were generally artificial islets formed of brushwood, stones and earth and steadied by piles driven through and around the mass.

The first traces in North America of anything resembling the lake dwellings of Europe are at the mouth of Naaman's Creek, a tributary of the Delaware. The custom of living in wooden houses erected on piles over the waters of a lake or inlet of the sea is still practiced by barbarous tribes in the Malayan Archipelago, New Guinea, Venezuela and in Central Africa; in fact, the name Venezuela (little Venice) was given because of the prevalence of these pile-dwellings along its shores.

LAKE OF THE WOODS, a body of water lying on the boundary between the United States and Canada. The greater part of its surface, which is estimated at 2,000 square miles, lies in Western Ontario; about one-quarter is in Minnesota, and sixty square miles, comprising two small bays, are in Manitoba. The lake is about sixty-five miles long, from ten to fifty miles wide, and about 300 miles in circumference. It is famous in history as the location of some of the first trading posts in the West, and also as an important factor in several boundary disputes between the United States and Great Britain. According to the treaty which ended the Revolutionary War the boundary was to run from the northwest angle of the lake "on a due course west to the river Mississippi." The later discovery of the Mississippi's source 100 miles south was naturally followed by disputes, but the present boundary was fixed by the Convention of London in 1818.

The hilly shores and the dozens of islands are covered with the forests which have given

the lake its name. Lumbering is naturally the principal occupation of the region, and there are large mills at Kenora and other points on the lake. Fishing is also important as an industry and as a sport, and the lake is now perhaps best known as a summer resort. Railways run along the northern and southern shores, and in summer there are excursion

LOCATION MAP

steamers which ply up and down the lake, and go east on Rainy River as far as Fort Frances. The Winnipeg River issues from Lake of the Woods at its northern end.

LAKES, in painting, are pigments, or colors, formed by separating animal or vegetable coloring matters from their solutions, chiefly with oxide of tin or alumina. The name is taken from *lac,* the substance from which they were originally prepared. The cochineal and madder lakes are used only by artists. Cochineal pigments—carmine, crimson lake, scarlet lake, purple lake and Florentine lake—do not possess the permanency of the madder lakes and are used particularly in flower painting. The madder pigments, called rose madder or madder lake and madder carmine, are of great value both as oil and water colors. See COCHINEAL; LAC.

LAKES, GREAT. See GREAT LAKES, THE.

LAKE SCHOOL, or **LAKE POETS,** as Wordsworth, Coleridge and Southey were called, were so named by the *Edinburgh Review* because they chose to live in the lake district of Cumberland and Westmoreland. Their only characteristic in common was a dislike of the stiffness of the prevailing classicism and a determination to cultivate a simple and natural school of poetry. They wrote at the beginning of the nineteenth century, which was sometimes called the second age of English verse.

LAKEWOOD, OHIO, in Cuyahoga County, is a residential suburb called the "City of Beautiful Homes," four miles west of Cleveland, on the shore of Lake Erie. Lake Avenue, the principal thoroughfare, is lined by the handsome residences of Cleveland business men. The city has a Masonic Temple, Carnegie Library, Lakewood Hospital and a number of beautiful church buildings. There are a few manufacturing plants in the eastern part of the city. The area is nearly six square miles. The population in 1910 was 15,181; in 1916 it was 22,615 (Federal estimate).

LAMAISM, *lah'ma iz'm,* an offshoot from Buddhism, so called from its *lamas,* or priests. This cult had its origin in the seventh century A. D., and is yet professed by the Tartar tribes of Tibet, Mongolia and Manchuria. Buddha is worshiped as the founder of the religion and is supposed to be embodied in the two priestly leaders, *Dalai-Lama* and *Tensh-Lama.* The former is the more powerful of the two by reason of his larger territorial possessions, and is the recognized head of the Buddhists inhabiting Tibet, Mongolia and China. See BUDDHISM.

LAMAR, *la mahr',* LUCIUS QUINTUS CINCINNATUS (1825-1893), an American statesman and orator, born in Eatonton, Ga., educated at Emory College (Oxford, Ga.) and admitted to the bar in 1847. After a short residence in Mississippi, Lamar returned to Georgia and was elected to the legislature in 1855. Again in Mississippi, he was twice made Congressman. In 1861 he resigned to become lieutenant-colonel in the Confederate army. Lamar drafted the secession ordinance for Mississippi. At the close of the war he was elected to Congress, holding a seat in the Senate from 1877 to 1885, and from 1885 to 1888 was Secretary of the Interior in the cabinet of President Cleveland. After 1888 he was Associate Justice of the United States Supreme Court, by appointment by President Cleveland. He vigorously opposed the inflation or debasement of the national currency, and for stating his opinions, while a member of the Senate, was asked by the Mississippi legislature to change his views or resign. Refusing to do either, Lamar submitted his case to the people, who enthusiastically upheld him.

LAMARCK, *la mark'*, JEAN BAPTISTE PIERRE ANTOINE DE MONET DE (1744-1829), a French naturalist, renowned for his researches in botany, zoölogy and meteorology. He wanted to be a soldier, but his parents sent him to the Jesuit College at Amiens. Upon his father's death in 1760 Jean enlisted in the army during the Seven Years' War, but an accident made it necessary for him to abandon military life, and he went to Paris. There for many years he engaged in botanical work, meeting with such success that he was called "the French Linnaeus," after the famous Swedish botanist of that name. In 1793 the Museum of Natural History made him professor of the branch of zoölogy dealing with invertebrates, that is, animals without backbones. He originated several theories regarding the classification of animals and the theory of evolution, and from 1799 to 1810 published each year a meteorological report, being the first scientist to attempt to forecast the weather. Lamarck was the author of several volumes, among them, *Zoölogical Philosophy, Flora of France* and *Animals without Backbones.*

LAMARTINE, *lah mahr teen'*, ALPHONSE DE PRAT DE (1790-1869), a French poet, whose *Meditations,* published in 1820, created a deep impression and brought him instant fame. His idealized autobiography is contained in his *Confidences* and *Raphael.* In the former he tells of his love for Lucy, when sixteen years of age, his voyage to Italy several years later, and his love for the fisherman's daughter, Graziella. In 1820 he was an under officer of the legation at Naples. His *New Poetic Musings* and the *Poetic and Religious Harmonies* obtained for him admission into the French Academy, and added to his fame as a poet. In his *History of the Girondists* he espoused the cause of the Revolution. As a history this work is unreliable, as it is not based on documents, but it is written in a charming style. In his *History of the Restoration* he gave an interesting account of the literary salons of the times. His other works include *Voyage en Orient, Jocelyn, Last Song of Childe Harold's Pilgrimage* and *History of the Revolution of 1848.*

LAMB, CHARLES (1775-1834), an English writer, best known as a light essayist. Born in London, he was sent to school at Christ's Hospital, where was begun his lifelong intimacy with Coleridge. In 1789 he became a clerk in the South Sea House, a position which he held until 1792, when he went to work in the accountant's office of the East India Company. The tragedy which darkened his entire life appeared first in 1795. He himself suffered from a brief spell of mental derangement, and soon after his recovery the family was overcome with grief and horror at his sister Mary's fatal stabbing of her mother, during a fit of acute mania. Mary's attack passed off but returned at intervals during the remainder of her life, and the brother gave himself gladly to the care of his sister, sacrificing the happiness of marriage with the "gentle maiden" whom he loved.

CHARLES LAMB

In the years 1796 and 1797 Lamb contributed poems to volumes brought out by Coleridge, and soon afterward published with his friend Charles Lloyd a volume entitled *Blank Verse,* in which appeared his best-known poem, *The Old Familiar Faces.* Next came *Rosamund Gray,* a story which had slight success, and within the next seven years the drama *John Woodvil* and the farce *Mr. H.,* both of which failed on the stage. It was not, indeed, until he wrote, with his sister Mary, the *Tales from Shakespeare,* succeeded by his own version of the *Adventures of Ulysses,* that he became a popular writer. His *Specimens of English Dramatic Poets Who Lived about the Time of Shakespeare* showed him to be a critic of exceptional discrimination and sympathetic discernment, and brought to the notice of the literary public the merits of the hitherto almost ignored lesser dramatists of the sixteenth century. More firmly than on any of these, however, his fame rests on the two volumes of *Essays of Elia,* which were written during the later years of his life, and appeared in the *London Magazine.* From 1825 until his death Lamb lived upon a pension granted by the East India Company after his long period of service. Freedom from regular employment, however, seemed to hamper rather than to develop his genius, and in his last years he produced little of importance. He died at Edmonton, and was sincerely mourned by his large circle of friends,

for his wit and geniality had made him a charming companion, and his unselfishness and loyalty had knit his friends firmly to him.

The *Essays of Elia,* the writings which show Lamb at his best, are a series of essays on a variety of subjects, written in a genial, rambling style which few authors of his own or any other nation have equaled. Their particular charm lies in large part in the quaint humor, pure sentiment and delicate fancy that pervade them, and in the unreserved and ingenuous manner in which the author reveals himself. In both his essays and his letters his never-failing good humor, his gentleness and his rare devotion to his family and friends are reflected with great clearness. A.MC C.

Consult Dobell's *Sidelights on Charles Lamb;* Lucas's *Life of Charles Lamb.*

LAMENTATIONS, *lam en ta'shunz,* one of the poetical books of the Old Testament, attributed in authorship to Jeremiah. It is an acrostic dirge (see ACROSTIC) and was composed for use by professional mourners in leading the wailing of the people over the fall of Jerusalem. Four of its five divisions are in the peculiar rhythm of the Oriental dirge, each line rising to a climax and then dying away to silence. The poem pictures vividly the desolation of the city and the sufferings of its inhabitants, and voices the sorrow of the people for their sin, which, as they believed, was responsible for the city's catastrophe. They hope for and then despair of forgiveness, and the closing section is a cry to Jehovah for judgment.

LAMMERGEIER, *lam'er gi er,* the largest of the European eagles, also called the *griffin vulture,* because of its partiality for dead and decomposed meat as food. Its great strength permits it to break carcasses into bits or carry them to a great height in the air and then let them fall. In some regions it feeds upon tortoises. The lammergeier is about four feet in length, and measures from nine to ten feet across its wings. It is found in Northern Africa and Southern Asia, and sometimes in the mountains and deserts of Southern Europe. It builds a crude nest on a mountain ledge, where it lays one brown-spotted egg. Its plumage is beautiful, its flight majestic.

THE LAMMERGEIER

LAMP, a device for producing light artificially. The torch was the first lamp. However, the skin-clad cave man who first thrust a lighted rush into an animal's skull filled with melted fat and observed the result, discovered

ANCIENT LAMPS

This picture is introduced to help boys and girls to appreciate the blessings of an age of brilliant electric lights. In the lamps above rude wicks were placed, and the resulting light was sufficient only to brighten a room to a slight degree.

the essential principle of the lamp as we know it to-day. His discovery was certainly one of the most important in history.

The Greeks and the Romans with their genius for design simply improved the lamp's appearance and increased the illuminating power. They shaped shallow vessels of clay or metal, into which they poured an inflammable liquid. Sometimes several wicks were used, flax tow having by this time largely superseded rushes. To the ancients the lamp was not simply an article of domestic use. It was a symbol of wisdom and often appears as a sacred emblem. The old Greek myth, which tells how Prometheus stole fire from the gods, reflects the feeling of the early world as to the sacred mystery of fire.

No marked improvement in lamps took place until the end of the eighteenth century, when the Swiss chemist, Argand, substituted for the flat wick a tubular one set between two metal cylinders (see ARGAND LAMP). Shortly afterwards one of his assistants happened to notice that a flame burns more brightly when held under a tube of glass. The result of this observation was the lamp chimney. After the discovery of extensive oil wells in the United States, in the middle of the nineteenth century, kerosene began to be used instead of whale, lard and other oils. Because of the rapidly increasing use of gas and electricity for illuminating purposes the oil lamp is now practically out of date in cities.

LAMP'BLACK, a fine carbon or soot, produced commercially by the imperfect combus-

tion of such materials as coal or wood tar, pitch, petroleum, resin, etc. These substances are burned in brick furnaces or in cast-iron vessels; the dense smoke which results passes through a flue into the settling chambers, where the soot is deposited. Lampblack is used chiefly in the manufacture of paints and printers' ink, for which purposes the crude product is satisfactory; for India ink, the purified soot is preferred. See CARBON; INDIA INK.

LAMPMAN, ARCHIBALD (1861-1899), a Canadian poet whose lyrics have placed him in the front rank of nineteenth-century writers. Unfortunately his life was cut short when he was just beginning to win popularity, yet his work had continued to win recognition. Lampman was born at Morpeth, Kent County, Ontario, and was a descendant of United Empire Loyalists, of German extraction, who emigrated from Pennsylvania at the beginning of the Revolutionary War. Soon after his graduation (1882) from Trinity College, at Toronto, he entered the government service at Ottawa, which thereafter remained his home. In his college days he had begun to write verses, but it was not until 1888 that he issued his first volume. *Among the Millet and Other Poems* and *Lyrics of Earth* are collections of his poems which appeared during his lifetime. After his untimely death his friend and fellow-poet, Duncan Campbell Scott, edited a complete edition of his *Poems*. Examples of his verse may be found in the *Oxford Book of Canadian Verse*.

LAMPREY, *lam'pri,* an eellike fish, with a long, slender body and smooth, scaleless skin. The mouth is a sucking organ, provided with horny teeth by which lampreys attach themselves to living fishes and suck their blood. They also feed on insects and worms. The *brook,* or *mud, lamprey,* about eight inches long and bluish-black, is found in lakes and brooks from New York to Minnesota and Kentucky. The *sea* lamprey of the European and Mediterranean coasts is dark brown in color, mottled with black, and attains a length of three feet. It follows the shad up the rivers to spawn in fresh water in the spring, returning to the sea in the autumn. A little blood poured into the water inhabited by lampreys soon attracts them to the spot, and they may then be caught in traps, like eels.

LANCASTER, OHIO, the county seat of Fairfield County, is situated southeast of the geographical center of the state, thirty-one miles southeast of Columbus, on the Hocking River and the Hocking Canal. The Pennsylvania (C. A. and C. Division) and the Hocking Valley railroads serve the city; the Scioto Valley Traction Company connects with Columbus. In 1910 the population was 13,093; it had increased to 15,670 in 1916 (Federal estimate). The area of the city is a little less than four square miles.

Lancaster is located in a fertile valley and is the farming center of Fairfield County. Near the center of the city Mount Pleasant rises to an elevation of 200 feet, and surrounding it are seventy acres of the county agricultural grounds, which are used as a park. On another eminence stands the county courthouse. The city has a $75,000 Federal building, the Sherman Armory, the state industrial school for boys, Crawfis Institute, a commercial school, a high school and a library. Lancaster is extensively engaged in the manufacture of shoes, 1,200 people being employed in these factories. In addition, there are glass factories, carbon works, farm implement plants, rubber-tire and lens factories. The shops of the Pennsylvania Railroad are also located here.

Lancaster was founded in 1800 by Ebenezer Zane. It was incorporated as a village in 1831, and in 1851 as a city of the third class. Some of the early settlers came from Lancaster, Pa., and they decided to build their new city under the name of the old home. The growth of the city began in 1900 with the development of the natural gas fields in the vicinity, and it increased after 1907 when petroleum was discovered near by. C.H.S.

LANCASTER, PA., the county seat of Lancaster County, is an important commercial city and educational center in the southeastern part of the state. The population, which is almost entirely American, was 47,227 in 1910 and 50,853 in 1916 (Federal estimate). The area of the city exceeds four square miles. It is surrounded by many smaller towns, with which it is connected by more than a dozen interurban electric lines. It is on Conestoga Creek, a tributary of the Susquehanna River, and is served by the Pennsylvania and the Philadelphia & Reading railroads. Philadelphia is sixty-nine miles east, New York City is 159 miles northeast, and Harrisburg, the state capital, is thirty-six miles northwest.

Industries. Lancaster is situated in a rich agricultural country. The largest crops are wheat and tobacco. The cigars and tobacco manufactured in the city every year are valued at more than $2,000,000. The city is

noted for its manufacture of Hamilton watches (the output valued at $2,000,000 annually), umbrellas, parasols and canes; in the latter Lancaster ranks next to New York City. The manufactured goods of Lancaster city and county are valued at $41,000,000 yearly.

Buildings and Institutions. There are several attractive parks, the largest of which are Long's, seventy-seven acres, and Williamson's, seventy-one acres. In the city is a soldiers' and sailors' monument, marking the spot where the Continental Congress convened in 1777 (see CAPITALS OF THE UNITED STATES). Prominent buildings include the courthouse, Federal building, Y. M. C. A. and Y. W. C. A. buildings and the public market houses. Among the public libraries of the city are the Watts De Peyster Library, A. Herr Smith Memorial Library, Lancaster Law Library, and a semipublic library is owned by the Lancaster County Historical Society. A number of important church periodicals and scientific magazines are published here.

Lancaster is the seat of Franklin and Marshall College, Franklin and Marshall Academy, Froebel Kindergarten, Shippen School for Girls, Sacred Heart and Saint Mary's academies, Thaddeus Stevens Industrial School, Reformed Theological Seminary and Yeates Institute for Boys. In near-by towns are important schools; at Millersville is the oldest and largest normal school in the state; and at Lititz is the Moravian Seminary for girls, which is more than a century old.

The charitable institutions include the Ann C. Witmer Home for Widows and Maiden Ladies, the Long Home for Aged Women and the Stevens Home for Friendless Children. There are Lancaster General, Saint Joseph's Catholic and Lancaster County hospitals and the Lancaster County Hospital for the Insane.

The town was settled by English Quakers and Germans in 1717, incorporated as a borough in 1742, and received its charter as a city in 1818. C.N.

LANCASTER, HOUSE OF, the name of the kingly line that ruled in England from 1399 to 1461 and again in 1470-1471. The name originated during the reign of Henry III, who in 1267 conferred the title Earl of Lancaster on his second son, Edmund. On the failure of male heirs, John of Gaunt, fourth son of Edward III, married Blanche, the heiress of the House of Lancaster. Gaunt was created Duke of Lancaster in 1362, and at the same time his elder brother, Lionel, was created Duke of Clarence. In such manner originated the rival houses of Lancaster and York, whose emblems were, respectively, the red rose and the white rose.

In 1399, Henry of Lancaster, son of John of Gaunt, dethroned Richard II and became king as Henry IV, for, though his title was defective, his claim to the throne was accepted by Parliament. Henry was the first English king to rule by Parliamentary right. His successor, Henry V (1413-1422), maintained his position by winning the favor of Parliament and the Church, and by grace of his brilliant successes in the Hundred Years' War. The weak and inefficient Henry VI, who was deposed in 1461 and restored for a brief period in 1470, and whose troubled reign culminated in the Wars of the Roses, was the last representative of the Lancastrian line. Shakespeare gives a vivid picture of this period of English history in his *King Henry VI.*

In connection with the above, see YORK, HOUSE OF, the rival of the Lancastrian line, and ROSES, WARS OF THE.

LANCELOT, *lan'se lot,* generally known as SIR LANCELOT DU LAC, one of the knights celebrated in the traditions and fables relating to King Arthur and the Round Table, as they found final shape in the *Morte d'Arthur* (1469) of Sir Thomas Malory. According to these, Lancelot was of royal birth. He was educated by the Lady of the Lake and was taken by her to Arthur's court, where he became one of the chief knights. His love for Guinevere, the beautiful wife of Arthur, constituted the tragedy of Lancelot's life. He fought in many combats for her, always extricating himself with valor under the protection of the Lady of the Lake. When Guinevere entered the sanctuary, he, too, was received into a cloister, thus giving up forever the hope of taking her away to the distant retreat of Joyeuse Garden. Upon the death of Guinevere he was summoned to bury her beside the corpse of Arthur, and he soon followed her in death. Elaine, the beautiful maid of Astolat, loved Lancelot and died for her love. Lancelot is one of the chief characters of Tennyson's *Idylls of the King,* and the story of his love for Guinevere is the principal theme of the twelve books. See ARTHUR, KING; MALORY, SIR THOMAS.

LANCE'WOOD, the name of several tropical trees and their wood, which is of unusual tenacity and elasticity. Because of these qualities it is much used for cabinetwork, surveyors' and fishing rods, carriage shafts, etc. Even

the Deacon who built Oliver Wendell Holmes' *Wonderful One-Horse Shay*—

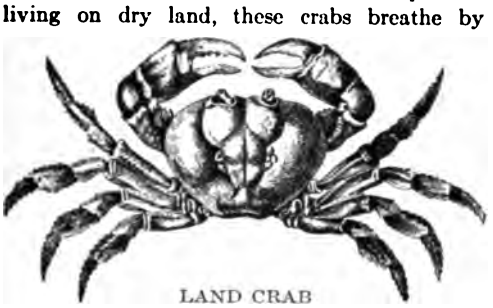
Sent for lancewood to make the thills.

Lancewood is light yellow in color, and resembles boxwood.

LAND AND SEA BREEZES are the shore breezes which blow alternately from sea to land and from land to sea in warm climates, and in temperate regions in summer. During the day, as the land grows warmer the air pressure becomes lower and the air rushes in from the sea, which for the most part remains at the same temperature, and during the day is usually much cooler than the land. This breeze usually continues from noon into the night, when the land cools rapidly. The atmospheric conditions are then reversed; the warmer ocean, being the area of atmosphere of low pressure, receives the breeze from the cooler land. This breeze lasts until the middle of the morning, when it dies, and the calmer part of the day sets in, because the temperature of the land and the sea are about the same for several hours.

These breezes are sometimes noticeable ten miles inland, although two or three miles is as far as they usually penetrate. Land and sea breezes occur daily in the tropics, but are not invariable in temperate regions. Similar breezes blow on the shores of the Great Lakes. See WIND.

LAND CRAB, the name given to any sort of crab which lives on land. There are a number of such species, and they almost exactly resemble common crabs. In spite of living on dry land, these crabs breathe by



LAND CRAB

gills, but they are provided with a moisture chamber lined with spongy membrane which keeps the gills damp indefinitely. Land crabs are found in the warmer countries of both hemispheres, burrowing beneath rocks, roots or in the sand during the day, and coming out only at night, except in rainy weather. All land crabs carry their eggs to the water, and at the beginning of the rainy season in May the migration to the sea begins. The male crabs start the march and are followed in two or three days by the females. They have an annoying habit of refusing to turn from their path and of walking straight through, or under, a house, where such a feat is possible. In tropical countries the rattling of land crabs over the floor at night is a common sound. Several species are edible; in Jamaica they are a regular article of food for the natives, but are disliked by the whites. The most common are the *black crab,* or *mountain crab,* of the West Indies, and the *white crab* of Jamaica.

LANDOR, *lan'dawr,* WALTER SAVAGE (1775-1864), a graceful and forceful English writer, whose fame rests chiefly on his dialogue essays *Imaginary Conversations* between ancient and modern celebrities. He studied at Rugby and Oxford, but was expelled from both institutions for unruliness. He published a small volume of poems in 1795 and a long poem, *Gebir,* in 1798. The latter was afterwards translated into Latin. Among his other poetical works are *Simonides; Count Julian, Hellenics;* and *Collected Poems.* His prose works include *Pericles and Aspasia; The Last Fruit Off an Old Tree; Dry Sticks Fagoted,* and others.

LANDS, PUBLIC. Parts of the national domain still under the ownership and control of the government, but held for future sale or other disposal are called *public lands.* Literally the term includes all lands owned by the government; in common use, however, it is applied only to land intended for development or settlement, not to forest reserves (see FORESTS AND FORESTRY) and other restricted areas.

In the United States. The public lands of the United States were acquired by cessions from the states and by purchase and conquest from the Indians and from foreign nations. In 1781, when the Confederation was organized, the new government found itself the owner of New York's claim to certain lands between the Alleghany Mountains and the Mississippi River. Between that date and 1802, when Georgia relinquished its claims, all the Atlantic coast states surrendered to the national government the western lands which they claimed under their colonial charters. Connecticut and several other states reserved a few sections for the assistance of the Revolutionary War veterans and for similar purposes, but these areas were comparatively small. In 1803 the national domain was doubled by the Louisiana Purchase, which added more than 1,000,000 square miles, if Oregon is included

(see LOUISIANA PURCHASE). Sixteen years later, in 1819, 60,000 square miles were secured by the purchase of Florida from Spain. The annexation of Texas in 1845, the Mexican cessions in 1848 and the Gadsden Purchase of 1853 rounded out the territory of the United States proper to its present boundaries.

After the territory of states and foreign nations was thus acquired there still remained to be settled the rights of those who had the best claim to the land—the Indians. As the settlements of the white men spread westward, the Indians were forced to move ahead of them in the same direction. Usually the government purchased the Indian lands, and offered in exchange lands farther west. Even in the West the Indians have not found a safe retreat, and many of their reservations have one by one been taken over by the government and thrown open to settlement, though the government has given financial compensation. See INDIANS, AMERICAN, subhead *Indian Reservations.*

Disposal of Public Lands. The United States has, from time to time, disposed of public lands of a total estimated area approaching one billion (1,000,000,000) acres, or nearly half the total area of the country. The policies which have governed the distribution of these vast tracts have changed frequently, but it is possible to summarize them. The first plan was to make the lands yield a revenue—in the words of Alexander Hamilton, "to effect a gradual discharge of the domestic debt, and furnish liberal tributes to the Federal treasury." As the country grew richer two other purposes became prominent: to induce settlement of the lands and to provide funds for public purposes which would have placed too great a burden on the people if paid by taxation. To encourage settlement, large tracts were first sold to land companies, notably in Ohio and Kentucky, the companies agreeing to secure settlers. Later, land was sold in small lots, occasionally on credit, to individual settlers. The credit system was abolished in 1820, and thereafter land was sold for cash in areas as small as eighty acres, for $1.25 an acre. After 1837, when a panic ended the boom in Western lands, the *preëmption* system was introduced, and in 1862 the first of the *homestead laws* was passed. (The article on the latter subject tells how *preëmptions* and *homesteads* are obtained.)

In the early days of the republic, and indeed until a decade after the War of Secession, large areas were granted to individuals as a reward for distinguished services to the nation. Nearly 10,000,000 acres were given to veterans of the Revolution and the War of 1812, and about 60,000,000 acres were set aside for soldiers who had taken part in the Mexican War. Millions of acres were also granted at various times to corporations engaged in building roads, canals and railways. The construction of the Illinois

LAND GRANTS

Limits within which land grants were made by the United States government to aid in the construction of railroads and highways. The maximum amount of land granted was one-half of the area (usually every other section) within the shaded parts of the above map. The total area granted to railroad companies was 190,000,000 acres; for wagon-road construction, 3,300,000 acres.

Central and the Pacific railways was made possible by the grant of more than 200,000,000 acres; from the sale of these lands the railroads have added greatly to their income, but in the beginning they could not have been built without such assistance. In 1902 Congress passed the Reclamation Act, which set aside all money received from the sale of public land in sixteen of the western arid or semiarid states as a special fund for the construction and operation of irrigation systems (see IRRIGATION).

Perhaps the most important of all land gifts have been those to the states to encourage education. All states admitted to the Union before 1850 received one-thirty-sixth of their area—one section in each township—as a foundation for a school fund. Those admitted since 1850 have received two sections in each township. The land thus granted—about 75,000,000 acres—is a small fraction of the total granted in other ways, but it has been the means of providing each new state with revenue to establish its public school system. Each state on its admission has also received a tract of from one to four townships to create a fund for a state university, and by the Morrill Act of 1862 it also receives an area proportionate to

its representation in Congress as a subsidy or endowment for an agricultural college. These additional gifts have involved about 10,000,000 acres.

Remaining Public Lands. Though much of the public land has thus been granted or sold, large sections still remain, chiefly in the West. The following table gives the areas still unappropriated and available for settlement, on July 1, 1916:

STATE OR TERRITORY	AREA UNAPPROPRIATED AND UNRESERVED			STATE OR TERRITORY	AREA UNAPPROPRIATED AND UNRESERVED		
	Surveyed	Unsurveyed	Total		Surveyed	Unsurveyed	Total
	Acres	Acres	Acres		Acres	Acres	Acres
Alabama	42,680	.....	42,680	Montana	9,229,154	7,420,571	16,649,725
Alaska*	.....	.....	.....	Nebraska	137,936	8,320	146,256
Arizona	6,566,288	17,030,931	23,597,219	Nevada	30,529,318	24,845,759	55,375,077
Arkansas	402,219	.....	402,219	New Mexico	18,437,388	7,900,991	26,338,379
California	15,777,934	4,248,065	20,025,999	North Dakota	381,199	.....	381,199
Colorado	12,905,344	2,002,783	14,908,127	Oklahoma	55,250	.....	55,250
Florida	135,237	.....	135,237	Oregon	13,942,348	1,395,461	15,337,809
Idaho	8,831,490	6,679,071	15,510,561	South Dakota	2,328,807	53,781	2,382,588
Kansas	56,018	.....	56,018	Utah	14,435,859	18,532,978	32,968,837
Louisiana	44,804	.....	44,804	Washington	982,783	149,788	1,132,571
Michigan	90,540	.....	90,540	Wisconsin	5,872	.....	5,872
Minnesota	798,804	.....	798,804	Wyoming	26,567,740	1,960,752	28,528,492
Mississippi	30,374	.....	30,374				
Missouri	952	.....	952	Grand Total	162,716,338	92,229,251	254,945,589

* The unappropriated lands in Alaska are not included herein. The total area of Alaska is 378,165,760 acres, of which about 15,500,000 acres are reserved.

Management of Public Lands. The administration of the public domain is the work of the General Land Office, a bureau in the Department of the Interior. At its head is the Commissioner of Public Lands, who is appointed by the President and receives an annual salary of $5,000. The Commissioner is responsible for the surveying and sale of lands, and for all documents and records in connection with them. He reports annually to Congress, and issues maps and circulars of information to the public. In each state where the area of the public lands exceeds 100,000 acres there are local Federal land offices, in charge of a register and a receiver, both appointed by the President. The registrar receives applications for land, and when the final payments have been made issues a certificate entitling the owner to a deed, or patent, from the United States. The patents are issued by the General Land Office in Washington and are signed by the recorder and the secretary; formerly they were signed by the President, but a secretary, appointed by the President, now performs this duty. All decisions of the local receivers or registers are subject to final approval by the Commissioner.

Ranges, Townships and Sections. When public lands are surveyed they are divided like a checkerboard into *townships* six miles square. Each township contains thirty-six sections of one square mile each, or 640 acres. The sections are subdivided into quarter-sections of 160 acres. For purposes of description all townships in a north and south line are said to be in a *range*. Certain of the meridians of longitude are called principal meridians and certain of the parallels of latitude are named as base lines. If a township is the second one north of a base line in the fifth range east of the second principal meridian it is described as *Township two north, range five east of the second,* as shown on the first diagram below. The description *SW ¼ NW ¼ Sec. 9, Tp. 2N R5*

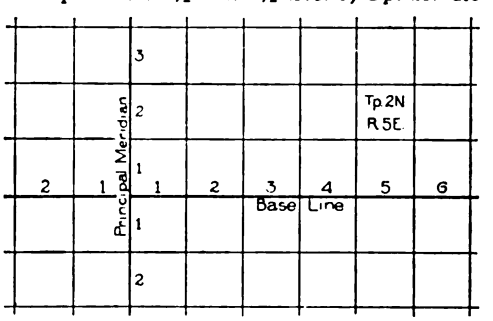
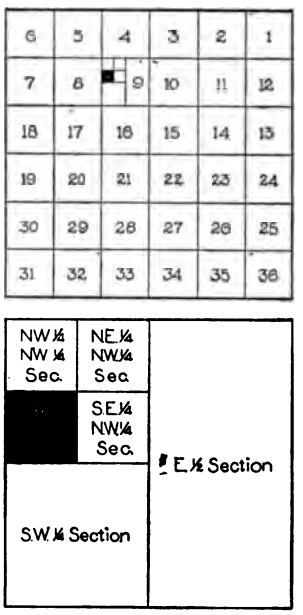


DIAGRAM OF TOWNSHIPS AND RANGES

E2 refers to the forty-acre tract shown in black in the diagrams; it means the southwest quarter of the northwest quarter of section nine in township two north in range five east of the second meridian.

In Canada. The public lands of the Dominion of Canada are known as *Crown lands.* They are situated almost entirely in the provinces of Manitoba, Saskatchewan and Alberta and in the Northwest Territories, and were acquired by purchase from the Hudson's Bay Company in 1869. Elsewhere in Canada the Crown lands are controlled by the provincial

governments, each of which retained its portion when incorporated into the Dominion. The only exception is in British Columbia, where the Dominion government owns a strip twenty miles wide on each side of the Canadian Pacific Railway, and a tract of 3,500,000 acres on the Peace River. Theoretically "Crown lands" are the property of the king, as in feudal days, but actually they belong to the people and are administered by their government.



HOW TO LOCATE A FARM

The upper diagram shows a regularly laid-out township of thirty-six square miles, or sections, each containing 640 acres. The lower diagram represents in enlarged form section nine of the upper. How many acres in this SW ¼ of the NW ¼?

The policy of the Dominion government has been to promote the proper settlement of its lands. Large areas have been given to assist railroad construction, and millions of acres of agricultural land have been granted to settlers under the terms described in the article HOMESTEAD LAWS. To the provincial governments have been ceded sections eleven and twenty-nine in each township to be sold for public school funds. The Dominion reserves all oil and mineral rights on land given to settlers. These rights and the privileges of grazing or cutting timber on unsettled land are leased to individuals or companies. Large tracts of land have been sold to irrigation companies.

The amount of land still in the possession of the Dominion government on January 1, 1915, and available for cultivation, is shown by the following table:

PROVINCE	AREA IN ACRES		TOTAL
	Surveyed	Unsurveyed	
Alberta	14,500,000	79,471,784	93,971,784
Manitoba	5,575,000	112,832,896	118,407,896
Saskatchewan	8,000,000	74,980,320	82,980,320
	28,075,000	267,285,000	295,360,000

There were also 2,457,000 acres in Alberta, 15,500 in Manitoba and 1,922,000 in Saskatchewan leased for grazing, which may later be available for settlement.

Administration of Public Lands. All lands in the control of the Dominion are in charge of a branch of the Department of the Interior, at the head of which is a Commissioner whose salary is $4,000 a year. A number of land agents are located in the four provinces in which the lands are situated.

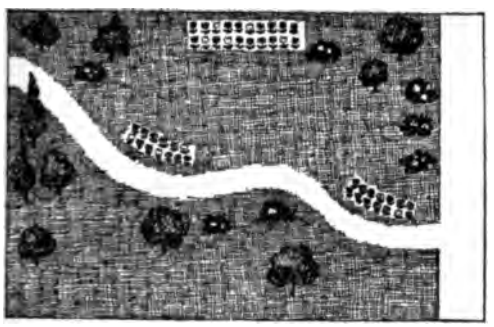
Canadian townships are surveyed in thirty-six sections, like those in the United States except that numbering begins at the southeast corner and finishes at the northeast corner (see the illustration above, of a township in the United States). The international boundary is taken as the base line, from which townships are numbered. W.F.Z.

LANDSCAPE GARDENING, or LANDSCAPE ARCHITECTURE, is the art of changing the natural surroundings of any place so as to produce the most artistic results. The architect may build a beautiful house, but if it is in the midst of a barren prairie the effect is not pleasing. The gardener, on the other hand, may lay out his garden according to a plan which totally disregards the house or its surroundings. It is the business of the landscape gardener or landscape architect to create a harmony in the landscape. If the architect has built a house which seems out of place, the landscape architect should change the surroundings so that the building seems naturally a part of the landscape. The work of an artist in landscape gardening is essentially like that of the landscape painter, for they both deal with perspective, mass, shadow and other principles. The painter, however, is handicapped, for he only creates a counterfeit in two dimensions, whereas the landscape gardener creates the picture in three dimensions. The gardener actually puts a hedge, a tree, a flower bed or a fountain where he thinks it looks best, but the painter can only reproduce it on a flat surface.

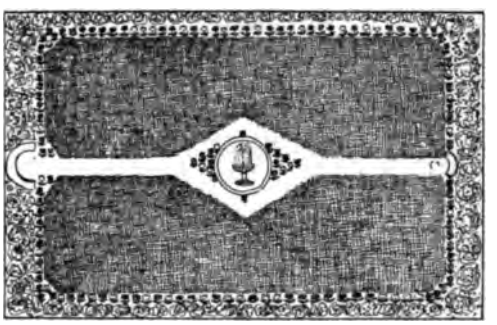
Landscape gardeners are concerned not merely with small houses in cities, but with country homes, both large and small, with

parks, playgrounds, cemeteries and expositions. The landscape gardening at the World's Columbian Exposition in Chicago in 1893 set a standard for work on a large scale which has never been surpassed. It was the work of Frederick Law Olmsted, whose father is generally regarded as the founder of landscape gardening in America. The work of Jules Guerin, director of color and decoration at the Panama-Pacific Exposition at San Francisco in 1915 was perhaps equally notable. The modern garden cemeteries, which are so characteristically a product of America, are other examples of landscape gardening at its best. In its largest field, landscape gardening is closely allied to, and is in fact a branch of, city planning (which see).

Landscape gardening to-day is divided into two distinct styles, one formal, the other informal. Formal landscape gardening attempts to improve Nature's work by making it regular. In formal gardening geometric figures are used as a basis. Gardens are laid out in regular shapes, squares, circles, ovals and balanced figures. The accompanying sketch shows a typical estate laid out on formal lines. The English or natural style, on the other hand, is informal. It, too, attempts to improve Nature's work, but it uses no fixed patterns. Its highest achievement is to make a landscape look natural.



AN INFORMAL GARDEN



ON FORMAL LINES

In the natural style, which has now almost entirely supplanted the formal or artificial method, straight lines, sharp angles or curves and elaborate patterns are avoided. Walks are irregular and winding, and groups of trees, flowers and shrubs are placed at intervals as if Nature herself had carelessly planted them there. Formal gardening is best suited to confined or small spaces, and is usually out of keeping with the vast stretches of great private estates or public parks; but the natural style is suitable both for large and small estates. The accompanying sketches show very simple gardens, arranged on formal and on informal lines. A.E.R.

Consult Bailey's *Garden Making;* Parson's *Landscape Gardening Studies.*

LAND'SEER, Sir Edwin Henry (1802-1873), an English painter, who won high renown for his pictures of animals. Dogs and deer were his favorite subjects, and he painted them with such skill and feeling that they stand out from his canvases almost as if alive. Landseer's artistic career falls into two periods, one of which began in early youth. His father, John Landseer, a London engraver and writer on art, early discovered the lad's skill in drawing animals, and trained him to sketch them accurately from life. At the age of five the boy drew fairly well, and before he was ten he proved himself an excellent draughtsman. When thirteen years of age Landseer first exhibited at the Royal Academy, and at fifteen he was already famous and had more commissions for work than he could possibly carry out. The painting which brought him prominently before the general public was his *Fighting Dogs Getting Wind,* exhibited in 1818. This picture, generally regarded as the masterpiece of his boyhood, is perfectly drawn, and finished with a minuteness which is almost photographic.

SIR EDWIN LANDSEER

Until about 1823 Landseer was satisfied to draw animals as they were, merely reproducing their natural expression and character. Dur-

ing the second period of his long career he constantly attempted, usually with remarkable success, to associate human sentiments with them. Many admirers feel that Landseer's best work is *Suspense,* which shows a dog watching at the closed door of his wounded master. *The Old Shepherd's Chief Mourner* is another favorite, as are also *A Distinguished Member of the Humane Society; The Cat's Paw; High Life and Low Life; The Illicit Whisky Still; The Monarch of the Glen,* a splendid buck against a background of mountains; *The Stag at Bay,* cornered by a wolf; and *Eos,* a portrait of the Prince Consort's favorite greyhound. *The Connoisseurs* is a portrait of himself and his two favorite dogs.

Landseer's paintings are very numerous. He worked with amazing rapidity, turning out finished sketches in a few hours, and in the course of his lifetime he finished thousands of paintings. His work won general recognition; he was elected to the Royal Academy, was knighted in 1850 and was paid enormous fees. Much of his popularity with the general public was due to his brother Thomas (1795-1880), who reproduced many of his paintings as steel engravings.

Consult Sweetser's *Landseer,* in "Artist Biographies;" Manson's *Makers of British Art.*

LAND'S END, a cape in Cornwall, the westernmost point of England, which marks the entrance to the English Channel and is the last point of land seen by voyagers out of the Channel when starting westward across the Atlantic Ocean. It ends in granite cliffs, sixty to a hundred feet high, fantastically carved by the water. The vicinity is noted for fine cliff scenery.

Dangerous reefs lie off the coast, one rocky islet being marked by the Longships lighthouse, a mile from the mainland. Tin is found in the vicinity, and the point is celebrated for one of the natural rocking stones of the kingdom, known as the Logan stone, weighing over sixty tons.

LANDSTURM, *lahnt'stoorm,* from a German word roughly meaning *a land's alarm,* is a term applied to the fourth, and last, division of the German and Austrian armies, consisting of men who have reached their thirty-ninth year and have passed through active, reserve and *landwehr* service, after which they are released from further military obligations, except in case of dire need in time of war. The *landsturm* is the last branch called out in a war levy. In the War of the Nations, which began in 1914, the landsturm, while not on the firing line, rendered good service in guarding roads, bridges and military supplies. See LANDWEHR.

LANDWEHR, *lahnt'vayr,* a term derived from the German, meaning *land defense,* is applied to militia for use in emergencies in Germany, Austria and Switzerland. It is not called into actual field service except in time of war. It corresponds roughly to the militia of the United States, except that service is compulsory.

The German landwehr consists of about 600,000 men, who in war are called out in two levies; the first takes the place of the regular army reserves, and the second does garrison duty. This branch of military service was first organized in 1813 by a royal edict, for the national defense of Prussia, and was extended to the empire of Germany in 1871. A German conscript, or enrolled soldier, completes his service in the landwehr at the age of thirty-nine, and is then transferred to the *landsturm* for service until his forty-fifth year. In the wars with Austria and France, as well as in the War of the Nations, which broke out in 1914, the landwehr proved an effective force. See LANDSTURM.

LANFRANC, *lan'frahngk* (?1005-1089), a churchman and scholar and the first archbishop of Canterbury after the Norman conquest. He was born at Pavia, Italy, studied law in his native city, and in 1039, in the hope of achieving greater distinction, he went to France. There he founded a school of law at Avranches, Normandy, which soon became one of the best known in Europe. In 1042 he entered the Benedictine monastery at Bec, of which he became prior in 1045. In 1066 he left Bec, and as a reward for obtaining the Papal consent to the marriage of William of Normandy to his cousin, was appointed abbot of a new monastery at Caen. Following William's conquest of England Lanfranc was appointed by him in 1070 to the archbishopric of Canterbury. He acted as regent of the kingdom during William's absence from the country and played an important part in religious and civil affairs. His writings include *Commentaries on the Epistles of Saint Paul, A Treatise Against Berenger* and some interesting sermons and letters.

LANG, ANDREW (1844-1912), a versatile writer who did many things well but who produced no single work of unusual merit, was born in Selkirk, Scotland. He collaborated with Professor Butcher on an excellent version

Odyssey. His contributions to the study mparative mythology and religion are *m and Myth; Myth, Ritual and Religion; of the Totem, The Clyde Mystery* and . He published several volumes of bal- biography, history, translations and fairy

He was educated at Edinburgh Acad- Saint Andrew's University and Balliol ge, Oxford. His works include *Lost Lead- d Letters on Literature; Homer and the A Defence of Sir Walter Scott and the r Minstrelsy; Shakespeare, Bacon and reat Unknown; Letters to Dead Authors,* ther volumes.

NGEVIN, *lahNzh'van'*, Sir Hector Louis -1906), a Canadian statesman, one of the s in the movement for Confederation, for three decades thereafter one of the conspicuous members of the Conserva- party. A member of a distinguished ec family, he won prominence in public s at an early age. He established an able reputation at the bar, and also gave of his time to literature, contributing fre- ly to the press, and serving as editor of *ournal of Agriculture*. His varied activi- dded to his social prominence, made him r of Quebec in 1858, when he was only years old. He served until 1861, and g the next five years held several port- in the Canadian Ministry, including of Solicitor-General for Lower Canada Postmaster-General. He was conspicuous e Confederation movement for his tact, ty and broad statesmanship, and was one e delegates to the conference at which the h North America Act was drafted.

er the organization of the Dominion, evin became Secretary of State in the first inion Cabinet. In 1873 he resigned with other members of the Macdonald Min- and remained in opposition until 1879, he became Minister of Public Works, a he filled with ability until 1891. From until his retirement from public life in he served without a break in the Do- on House of Commons. His ambition o create a feeling of brotherhood between own people and their English-speaking atriots. In recognition of his many serv- o Canada and the Empire Queen Victoria him a Knight of the Order of Saint ael and Saint George.

NGEVIN, The Most Reverend Louis ippe (1855-), a Canadian Roman olic churchman, archbishop of Saint Boni- face, and one of the most influential prelates in the Dominion. Archbishop Langevin was born at Saint Isidore, Que., and received his scholastic training at the Sulpician College, Montreal. For several years after his graduation he taught the classics in that college, but in 1881 he entered the Oblate Order. In 1882 he was ordained priest, and three years later was called to the chair of theology in the University of Ottawa. There he remained until 1893, when he removed to Manitoba to become superintendent of all the Oblate Missions in the Northwest Territories. After a year as superintendent, followed by a year as pastor of Saint Mary's Church at Winnipeg, he was honored by his consecration as archbishop of Saint Boniface. Though he was only forty years old at the time of this appointment, his subsequent career fully justified the confidence thus placed in him. In the breadth and depth of his influence he is a worthy successor of Archbishop Taché.

LANGLAND, William (?1332-1400?), with the exception of Chaucer, the greatest English poet of the fourteenth century. He was probably the author of *The Vision of Piers Plowman,* a great satirical allegory, vigorously attacking Church and State corruption; and of *Richard the Redeless,* dealing with the life of Richard II. Very little is known of Langland's life. He is supposed to have been born near Shropshire and to have studied with the Benedictine monks, after which he drifted to London, where he lived in poverty.

LANGLEY, *lang'li,* Samuel Pierpont (1834-1906), an American astronomer, physicist and pioneer in aeronautics. He invented the bolometer, the most delicate instrument for recording solar heat, capable of detecting a variation of less than one millionth of a degree. Langley was born at Roxbury, Mass., and was educated at the Boston Latin School. In 1865, after a period of study in Europe, he was appointed professor of mathematics in the United States Naval Academy at Annapolis, later becoming professor of astronomy at the Western University of Pennsylvania and secretary of the Smithsonian Institution in 1887. He established the Astrophysical Observatory and the National Zoölogical Park at Washington, became in 1886 president of the American Association for the Advancement of Science and received from Oxford University the degree of D. C. L., the Janssen medal of the Institute of France and the Rumford medal of the Royal Society of London.

The First Flying Machine. Three successful flights of half a mile having been made by power-driven models of Langley's construction in 1896, Congress granted him $50,000 to build a man-carrying aerodrome (as he called his aeroplane). But he met with ill success and finally abandoned the experiments for lack of funds. His last machine was generally called "Langley's Folly." On February 27, 1906, heartbroken, it is said, at the failure of his experiments, he died. Since his death, however, his genius has been vindicated, for in June, 1914, Glenn Curtiss performed many successful flights on the very machine on which Langley had placed his hopes. See FLYING MACHINE.

LANGTRY, *lang'tri,* LILY (1852-), an English actress, known as the *Jersey Lily* on account of her beauty, was born at Le Breton, on the island of Jersey. Her maiden name was LILY LE BRETON, and she was the daughter of a clergyman of the Church of England. In 1874 she was married to Edward Langtry, and in 1881 made her first stage appearance in London in *She Stoops to Conquer.* In the following year she visited America and was enthusiastically received, more, perhaps, on account of her physical attractions than for her ability as an actress. Two years after the death of her husband in 1897, she married Sir Hugo Gerald de Bathe. In 1903 she returned to America and starred in *The Crossways,* a play written by her in collaboration with J. Hartley Manners. She again visited the United States in 1912, appearing in vaudeville.

LANGUAGE, *lang'gwaje.* Men, birds and the higher animals have various ways of communicating with others of their own kind. In a way all these means of communication may be called *language,* but in the ordinary sense in which the term is used language means the articulate speech of man. Every nation and every tribe has its language, and there are upwards of 1,000 spoken languages in the world. Some of these, especially the languages of barbarous tribes, are very narrow in scope and limited in extent. They include a comparatively small number of words, and are spoken by a limited number of people. Unless a language has been reduced to writing it has not been systematized, neither does it have any standard by which it can be brought to a higher degree of perfection. It is a "grammarless tongue." The great languages of the civilized world are usually classified under two groups, called *families.* They are the *Indo-European* family, which includes most of the languages spoken in Europe and America (excluding the Indian languages) and some of the languages of Asia, especially those of India; and the *Semitic* family, which includes the languages of the Hebrews, Arabs, Abyssinians, Assyrians, Phoenicians and Syrians.

Origin of Language. Many theories have been advanced to account for the origin of language, but none seems to be perfectly satisfactory. One of these theories is that the first words used by men were imitations of the sounds of animals, and that some of these sounds have become permanent words. Just as a little child may indicate a dog by "bow-wow," so did the natives of Madagascar indicate an animal found upon that island by "aye-aye." Later, when the island was discovered by civilized men, this name was given the animal. In a similar manner the words *whip-poor-will* and *katydid* originated. Interesting as this theory is, it is not generally accepted.

The theory most widely accepted is that language, in the sense in which we are considering it, is peculiar to man, and that it has been developed through the ages to enable men to communicate their ideas to others. However this may be, wherever we find men we find them able to converse with each other, and it is through the development of language that the human race has been able to record its achievements from century to century, and in this way to enable each generation to improve upon all the generations that have preceded it since time began.

Steps in the Study of Language

The person who can use the mother tongue fluently, accurately and effectively in the expression of his thought has a power and a possession that will serve him at every turn.
—*Indiana Uniform Course of Study.*

The importance of the study of English cannot be overemphasized, and in the primary grades all the activities of the child's mind should be made to contribute to the strengthening of his power of expression through language. While the trite saying, "Every lesson a language lesson," should in a measure be regarded, language should not be made the chief end of every lesson, because every lesson has its specific purpose. A lesson on the violet, for instance, should be devoted principally to gaining a knowledge of that plant on the part of the pupils. Incidentally wrong forms of expression may be corrected, but if time is spent on drills in language, the lesson is diverted from its main purpose. These drills, however, are necessary; therefore courses of study provide for language lessons in every grade.

The course of study and the suggestions for its development given in the following pages conform to the plans outlined in the best state and provincial courses of study for common schools. The chief purposes of the suggestions are to set forth the underlying principles upon which the teaching of the English language rests and to call attention to the language facts upon which special stress should be placed in both the home and the school.

Underlying Principles. The following underlying principles are applicable to all language teaching, and they will be referred to as occasion requires in the pages that follow:

1. *The child learns language by listening to his mother.*

As is the mother's speech so will be the child's. If the mother pronounces words correctly, and has a soft, melodious voice, the child will from the beginning form correct habits of speech.

2. *The child learns language from literature and song.*

The child who is taught the classic nursery rhymes of Mother Goose and other children's favorites and who listens to the sweet lullabies of childhood unconsciously lays the foundation of a good literary taste. "It is the ear and not the script or print," says Chubb, "that is the first, as it is the final, arbiter and nurse of all lovely speech and song."

3. *The child learns language by listening to his associates.*

The playground and the street are the great sources of discouragement to the teacher of language and to cultured parents. Some advocate excluding the child from these influences to prevent the corruption of his speech. But character is developed only through contact with one's fellows, and there is great danger that the child will lose more than he will gain by such exclusion. The difficuty to be overcome is not, however, as great as it at first seems, provided the early home training has been of the sort described above. The child who has formed right habits of speech in the home, and who is encouraged to use them, will slough off the bad forms learned in the street just as he outgrows many other childish habits in the progress of his natural development, unless by repeated cautions not to use these expressions they are kept before him.

4. *Language is only one means, and often a limited means, of expression. Its usefulness is increased by the development of other means, such as gesture, drawing and construction work.*

5. *Language and thought supplement each other.*

The language the child learns affects his thought and is a strong factor in the development of his character. In the language of the poet—

> This price the gods exact for song,—
> That we become what we sing.

It naturally follows that only the best in language and literature should be presented to children.

Language Work in the Home. The foundation of language is laid in the home, therefore we reiterate the first principle: *The child learns language by listening to his mother.* To this we wish to add another truth of almost equal importance: *Early habits may be overcome, but they are seldom, if ever, forgotten.* What are the mother's duties in leading the child to take his first steps in talking?

1. *To pronounce words correctly.* The child will reproduce what he hears, hence care should be exercised in pronouncing all words ending in *ing*, as *making, walking;* and such words as *been, sir, sure,* etc.

2. *To use correct language forms,* as *Whom* did you *see?* He *did* the work yesterday; I *saw* John last week; I *have no* money. Many

people through carelessness violate the rules of speech daily in such sentences as are given above. Their practice is not on a par with their knowledge. If the child hears these violations in the home he will use them, believing that they are correct, and when the wrong forms are once learned it is difficult to eradicate them.

3. *To avoid "baby talk."* Perhaps no other practice in the home does so much to corrupt the child's speech as indulging in the *"tootsie wootsie little manny"* talk in which many good people take delight. Those who consider the child's welfare will refrain from such expressions, once they realize their influence upon his language.

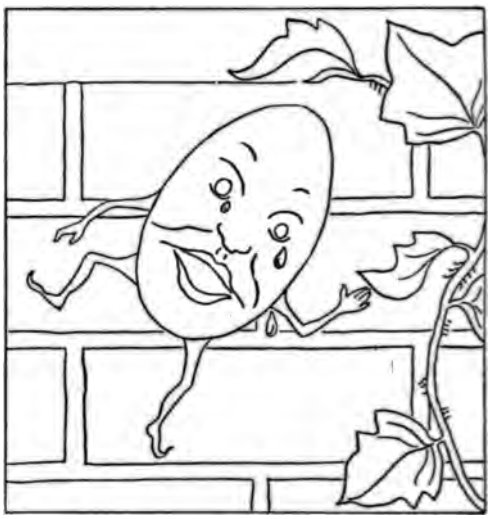
4. *To encourage the child to talk.* The child will talk all his life, and he should begin right. Children like to talk, but their chatter is too often suppressed by those who dislike to be "bothered." If simple words are used in conversation with the child he will soon learn them, and will use them in his conversation. Words difficult to pronounce and words whose meaning the child cannot understand should be avoided.

5. *To teach the child good literature.* A college professor once claimed that he could pick out his students who had learned *Mother Goose* melodies in childhood, by their use of language. Be this as it may, the value of the nursery rhyme, the nonsense jingle and the classic myth in laying the foundation of language is universally recognized. And unless these are taught in the early years when they appeal to the child's mind their influence will never be felt. Here are a few selections that every child should learn before his fifth year. The accompanying illustrations show what the mother may do to impress the story more strongly upon the mind. These selections should be taught incidentally as part of the child's play:

Little fishie in the brook,
Papa caught him with a hook,
Mamma fried him in a pan,
Baby ate him like a man!

Bye, baby bunting,
Father's gone a-hunting,
Mother's gone a-milking,
Sister's gone a-silking,
Brother's gone to buy a skin
To wrap the baby bunting in.

Pat-a-cake, pat-a-cake, baker's man,
Make me a cake as fast as you can;
Prick it and pat it and mark it with T,
And put it in the oven for Teddy and me.



HUMPTY DUMPTY

Humpty Dumpty sat on a wall;
Humpty Dumpty had a great fall,
And all the King's horses and all the King's men
Can't put Humpty Dumpty together again.

ROCK-A-BYE, BABY

Rock-a-bye, baby, in the treetop;
When the wind blows, the cradle will rock;
When the bough breaks, the cradle will fall;
Down will come baby, cradle and all.

Little Boy Blue, come, blow your horn;
The sheep's in the meadow, the cow's in the corn.
"Where's the little boy that looks after the sheep?"
"He's under the haystack, fast asleep."

DING, DONG, BELL

Ding, dong, bell,
Pussy's in the well!
Who put her in?
Little Tommy Linn.
Who pulled her out?
Big John Stout.

Little Miss Muffet
Sat on a tuffet,
Eating her curds and whey;
Along came a spider,
And sat down beside her
And frightened Miss Muffet away.

Little Bo Peep has lost her sheep
And can't tell where to find them;
Leave them alone, and they'll come home,
Wagging their tails behind them.

OLD KING COLE

Old King Cole
Was a merry old soul
And a merry old soul was he;
He called for his pipe,
And he called for his bowl,
And he called for his fiddlers three.
Every fiddler he had a fiddle,
And a very fine fiddle had he;
Twee; tweedle dee, tweedle dee,
Went the fiddlers three.
O! there's none so rare as can compare
With King Cole and his fiddlers three.

TWINKLE, TWINKLE, LITTLE STAR

Twinkle, twinkle, little star;
How I wonder what you are!
Up above the world so high,
Like a diamond in the sky.

When the glorious sun is set,
When the grass with dew is wet
Then you show your little light,
Twinkle, twinkle, all the night.

In the dark-blue sky you keep,
And often through my curtains peep;
For you never shut your eye
Till the sun is in the sky.

As your bright and tiny spark
Lights the traveler in the dark,
Though I know not what you are,
Twinkle, twinkle, little star!

6. *To coöperate with the teacher.* After the child enters school, the language training at home should be planned to fix in mind the lessons taught at school. In teaching all nursery rhymes and other selections care should be taken to teach them correctly. Many books contain revisions that differ widely from the original.

First Year. The child has the foundation for language when he enters school at five years of age. If he comes from a cultured home the foundation is well laid, and there should be no break between the work of the home and that of the school. Moreover, the work for the first year should be planned with a view to the work of the succeeding grades, so there will be no abrupt change in the language lessons as the pupil passes from one grade to another.

"All activities of the child may be made tributary to his training in English, since he is always doing something and telling about it." During the first year the work will be essentially oral. The teacher will be expected to follow the prescribed course of study, but the pupils should receive drill on the following points:

1. *Conversation Lessons.* "The teacher's prime duty is to make beautiful speech attractive." To this end children must be trained to talk, and that the desired results may be secured they must be made to feel so much at home that their speech will be spontaneous and natural. The creation of a homelike atmosphere in the schoolroom is essential to successful language lessons. If the teacher is natural and spontaneous, the pupils will follow her example.

The activities in the home, the stories the children know and those the teacher tells them, the birds, some of the common insects, simple flowers and plants, the reading lessons, the games the children play, and many other common experiences and pictures, may be drawn on for material for these lessons. The chief aim is to make good talkers—that is, so to guide the children that they will gain the power to tell what they know naturally and in logical sequence, and to express themselves in good English.

The first requisite is to fill the child's mind with ideas. All conversation lessons during the first and second years should be rich in content. The teacher should encourage the pupils to observe the objects about them and to tell what they see, feel and smell. She should lead them to extend their observations by careful questioning. Then before the lessons on any subject are dropped for something else, she should secure from each pupil just as complete a story as he can tell of what he has learned.

The nursery rhymes, stories and myths that the children have learned serve as excellent material for connecting the home with the school, since the pupils will be eager to tell what they know. These should be supplemented by many others during the year. The teacher should therefore be a good story-teller (see STORY-TELLING).

The most difficult task that confronts the teacher is that of securing correct forms of expression without suppressing the pupil's spontaneity. Criticism is necessary, but it must be given tactfully. The teacher who solves this problem successfully will solve without difficulty all other problems connected with her language work. The following suggestions will be found helpful:

(*a*) Be careful to use correct language. The pupils imitate your speech as well as your actions. If you use good language you are serving as a correct model.

(*b*) Emphasize correct forms by calling attention to them in such a way as not to embarrass the pupil. Ignore incorrect forms by not calling attention to them. When a pupil makes an error in telling his story it is best to let him finish, then ask him to tell it again and to try to say it as you do. In other words, your criticism should always be of such a nature as to lead the pupil to feel that you are helping him to say what he wants to tell in a better way.

2. *Reading.* Since this subject is discussed under its title, it is not necessary to give it space here further than to state that the reading lessons are vitally connected with the language lessons, and that they furnish much valuable material for language work.

3. *Written Work.* The child is always interested in doing something new, and some time during the first year the pupils should begin to write. Since writing is a form of expression, the writing exercises are closely related to the language lessons; when the pupils have had enough practice in writing to enable them to write two or more words, they may occasionally be called upon to write short statements, as *I saw a robin.* But the tendency is to introduce written exercises too early. Until the pupil has mastered the mechanics of writing, the act requires so much attention that it is impossible for him to express his thought. During the first year written exercises should be very brief, consisting at first of not more than one or two sentences. They may be increased in length towards the end of the year.

4. *Dramatization.* Children like to "act out" their stories and the little dramas that can easily be constructed out of such fables as *The Wind and the Sun* and *The Lion and the Mouse,* such poems as *Old King Cole* and

Queen of Hearts, and many simple stories. These exercises keep the pupils interested and also serve to strengthen their powers of expression. See DRAMA, page 1855.

5. *Material.* The best primers and first readers contain material of high literary value, but unfortunately many books of poems and prose selections for children and most of the educational journals publish much material for language and reading work that is decidedly below the standard approved by the best educators. Selections for memorizing and stories to be read or told to the pupils should be selected with the greatest care. When we have the works of the masters to draw upon, why seek inferior sources? The selections that follow are given as illustrations of the sort of material that should be selected:

The Queen of Hearts,
She made some tarts
All on a summer's day:
The Knave of Hearts,
He stole those tarts,
And took them clean away.

The King of Hearts,
Called for the tarts,
And beat the Knave full sore:
The Knave of Hearts
Brought back the tarts,
And vowed he'd steal no more.

The Swing

ROBERT LOUIS STEVENSON

How do you like to go up in a swing,
  Up in the air so blue?
Oh, I do think it the pleasantest thing
  Ever a child can do!

Up in the air and over the wall,
  Till I can see so wide,
Rivers and trees and cattle and all
  Over the countryside—

Till I look down on the garden green,
  Down on the roof so brown—
Up in the air I go flying again,
  Up in the air and down!

What Does Little Birdie Say?

ALFRED TENNYSON

What does little birdie say,
  In her nest at peep of day?
"Let me fly," says little birdie,
  "Mother, let me fly away."
Birdie, rest a little longer,
Till the little wings are stronger.
So she rests a little longer,
  Then she flies away.

What does little baby say,
  In her bed at peep of day?
Baby says, like little birdie,
  "Let me rise and fly away."
Baby, sleep a little longer,
Till the little limbs are stronger.
If she sleeps a little longer
  Baby, too, shall fly away.

Seven Times One

JEAN INGELOW

There's no dew left on the daisies and clover,
  There's no rain left in heaven:
I've said my "seven times" over and over,
  Seven times one are seven.

I am old, so old I can write a letter;
  My birthday lessons are done;
The lambs play always, they know no better;
  They are only one times one.

O moon! in the night I have seen you sailing
  And shining so round and low;
You were bright! ah, bright; but your light is failing—
  You are nothing now but a bow.

You moon, have you done something wrong in heaven
  That God has hidden your face?
I hope if you have you will soon be forgiven,
  And shine again in your place.

O velvet bee, you're a dusty fellow,
  You've powdered your legs with gold!
O brave marsh marybuds, rich and yellow,
  Give me your money to hold.

O columbine, open your folded wrapper,
  Where two twin turtle-doves dwell!
O cuckoopint, toll me the purple clapper
  That hangs in your clear green bell!

And show me your nest with the young ones in it;
  I will not steal them away;
I am old! you may trust me, linnet, linnet—
  I am seven times one to-day.

The Fox and the Crow

A Fox once saw a Crow fly off with a piece of cheese in its beak and settle on a branch of a tree.

"That's for me, as I am a Fox," said Master Renard, and he walked up to the foot of the tree.

"Good-day, Mistress Crow," he cried. "How well you are looking to-day; how glossy your feathers; how bright your eye. I feel sure your voice must surpass that of other birds, just as your figure does; let me hear you sing, that I may call you queen of birds."

The Crow lifted up her head and began to caw her best, but the moment she opened her mouth the piece of cheese fell to the ground, only to be snapped up by Master Fox.

"That will do," said he. "That was all I wanted. For your cheese I will give you a piece of advice: Do not trust flatterers."

The Owl and the Pussy-Cat

The Owl and the Pussy-Cat went to sea
  In a beautiful pea-green boat;
They took some honey, and plenty of money
  Wrapped up in a five-pound note.
The Owl looked up to the stars above,
  And sang to a small guitar,
"Oh, lovely Pussy! Oh, Pussy, my love!
  What a beautiful Pussy you are!"

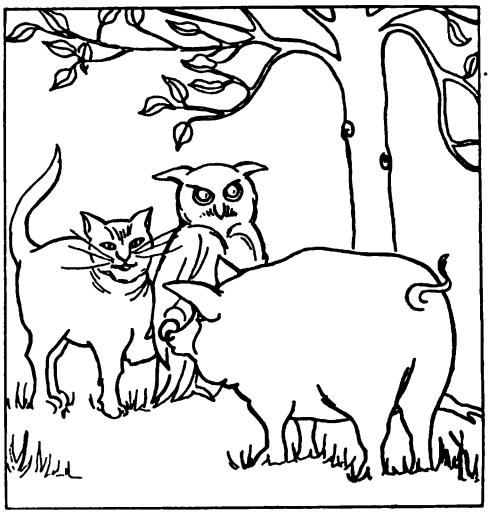
THE OWL AND THE PUSSY-CAT

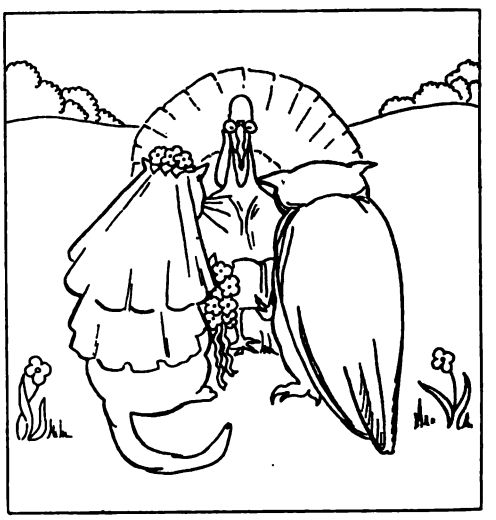
Pussy said to the Owl, "You elegant fowl!
How charmingly sweet you sing!
Oh, let us be married—too long we have tarried—
But what shall we do for a ring?"
They sailed away for a year and a day
To the land where the Bong-tree grows,
And there in a wood a piggy-wig stood
With a ring in the end of his nose.

"Dear Pig, are you willing to sell for one shilling
Your ring?" Said the piggy, "I will."
So they took it away, and were married next day
By the turkey who lives on the hill.
They dined upon mince and slices of quince,
Which they ate with a runcible spoon,
And hand in hand on the edge of the sand
They danced by the light of the moon.

Second Year. The work of the second year is a continuation of that already outlined for the first year. The amount of written work should be increased; the child's ability to describe what he sees and hears should be doubled, and the selections learned should be longer and more directly connected with character building. The lines of work suggested for the previous grade should be continued. More attention should be given to details such as capitals and periods in writing, and the use of correct forms of pronouns and verbs.

1. *Oral Composition.* This is the most important line of work for the second and third years. If children speak correctly they will write correctly, unless they become confused by the mechanics of writing. But on the other hand, because children (or adults, for that matter) may write correct English, it does not follow that they will speak correctly. We should therefore place all possible emphasis on securing fluency and accuracy of speech.





The two chief essentials to good oral composition are that the child has something to tell and someone to whom he wants to tell it.

Subjects in which the pupils were interested the first year should be taken up again this year and enlarged upon, but the teacher must keep the lessons within the capacity of the pupils, or they will soon lose interest and enthusiasm. The teacher will find a wealth of material for language lessons in these volumes. The article BIRD, for example, and its related topics give an idea of the abundance of material which the work contains. Look up in a similar manner ANT; BEE; DICKENS, CHARLES; LONGFELLOW, HENRY W., and the programs for special days.

2. *Picture Study.* Excellent lessons can be based on the study of pictures. The pictures

should be such as will interest the children. Pictures of children and of animals and birds, provided they show action, can be used most successfully. The picture shown here is one of that sort. The little foreign children and the geese are all in motion and all seem to be happy. Study the expression on the children's faces. Notice the natural poise of each figure and the man on the curb holding the baby. The background suggests a village street as the scene of the play. Ask the pupils to give each child in the picture a name. Learn what the children know about geese, and if they do no not know about them give them the desired information (see GOOSE). These are Dutch children, and the teacher should tell the pupils how children take care of geese in Holland.

A HOLLAND SCENE, FOR PICTURE STUDY

Each child may be allowed to make up his own story about the picture, and finally one story may be agreed upon by the class as the story that shall be told. The study should occupy several recitation periods.

3. *Written Work.* The best results in written work are obtained in this year, if most of it is done by dictation. Let the pupils dictate for the teacher, who will write on the board what they say. In this way they learn how their expressions appear in written form. Let the pupils do most of their writing on the board (see PENMANSHIP), with occasional exercises on paper. The main purposes of these exercises are (1) to secure expression of thought in correct written form, and (2) to gain facility in writing. Pupils should never be asked to write anything until they have recited it over and over so that they are perfectly familiar with it. All written work during the second year should consist of statements in the form of simple sentences; as—

The apple is red.
The ball is round.
The flower is pretty.

4. *Selections for Memorizing.* The following selections are types of the material suitable for second year language work. While children memorize readily at this time, systematic training in memorizing is necessary. They should memorize accurately, and the teacher should see that they know the meaning of the selection before they memorize it. Generally the pupils should tell the fables and other short stories in their own words, but poems should not be so treated.

Where Go the Boats?

ROBERT LOUIS STEVENSON

Dark brown is the river.
Golden is the sand.
It flows along forever,
With trees on either hand.

Green leaves a-floating,
Castles of the foam,
Boats of mine a-boating—
Where will all come home?

Or, goes the river
  And out past the mill,
Away down the valley,
  Away down the hill.

Away down the river,
  A hundred miles or more,
Other little children
  Shall bring my boats ashore.

Autumn Fires

ROBERT LOUIS STEVENSON

In the other gardens
  And all up the vale,
From the autumn bonfires
  See the smoke trail!

Pleasant summer over
  And all the summer flowers,
The red fire blazes,
  And the grey smoke towers.

Sing a song of seasons!
  Something bright in all!
Flowers in the summer,
  Fires in the fall!

The Brown Thrush

LUCY LARCOM

There's a merry brown thrush sitting up in a tree:
  "He's singing to me! He's singing to me!"
And what does he say, little girl, little boy?
  "Oh, the world's running over with joy!
    Don't you hear? Don't you see?
    Hush! look! In my tree
    I'm as happy as happy can be!"

And the brown thrush keeps singing, "A nest do you see,
    And five eggs hid by me in the juniper tree?
Don't meddle! don't touch! little girl, little boy,
  Or the world will lose some of its joy!
    Now I'm glad! now I'm free!
    And I always shall be,
    If you never bring sorrow to me."

So the merry brown thrush sings away in the tree,
  To you and to me, to you and to me;
And he sings all the day, little girl, little boy,
  "Oh, the world's running over with joy!
    But long it won't be,
    Don't you know? Don't you see?
    Unless we're as good as can be."

The Goose That Laid the Golden Eggs

Once upon a time there lived a man who had a handsome Goose that every day laid a large golden egg. The man thought the Goose must have much gold inside of her, and so one day he wrung her neck, and found that she was just like any other Goose. Thinking to find wealth, he lost the little he had.

Third Year. 1. *The Textbook.* The third year is often a critical time in language work, for most courses of study call for the introduction of a textbook, either at the beginning or in the middle of the year. However meritorious the textbook may be it is at first a stumbling-block to the pupil—a new tool which he has not learned how to use. It is the teacher's first duty to become thoroughly familiar with the book. She should know its plan and scope so well that she can readily adapt it to the class. Doubtless several preliminary lessons will be necessary before the book is regularly taken up. Most language books now in use are well planned, and when the book is introduced its plan should be followed, otherwise the pupils will become confused. This does not mean, however, that the lines of work pursued in the previous years should be abandoned. The textbook should be a means of giving more definite plans for the continuance of this work.

2. *Oral Composition.* The work in oral composition should be greatly amplified during the third year. The pupils can now describe quite fully and accurately flowers, clouds, animals and other natural objects. They will also be able to tell how a house is built, what is found in a grocery store, and to describe many of the occupations common to the locality. They can now reproduce such stories as *Golden Locks and the Three Bears, Cinderella* and *Little Red Riding Hood.* A goodly number of myths and fairy tales should be given them, the longer ones being told or read by the teacher without any thought of their reproduction on the part of the pupils. Criticism can now become more pointed, and the pupil may be stopped in the midst of his recitation and asked to correct his language without the danger that such interruptions will affect his fluency, provided it is done in a kindly spirit. At this age pupils are likely to wander from the subject, and this tendency should be checked as soon as it appears. Encourage the children to be natural.

The teacher can find no better source of material for this work than in these volumes. History stories and stories of the boyhood of great men should be introduced this year.

3. *Written Work.* The pupils should now be able to give short, connected accounts, in writing, of what they learn, and the written exercises should be increased in frequency and in length. To the exercises in original composition should be added exercises in copying stanzas of poetry and short paragraphs from the reader or other books. These exercises should be brief, but the teacher should insist upon accuracy. The work here suggested is supposed to be supplementary to the exercises given in the language book. Many written

exercises admit of illustration, and the pupils should be encouraged to draw them, since each mode of expression aids the other.

4. *Letter Writing.* All the writing that most of the pupils will do after they leave school will consist in writing letters, and exercises in letter writing can be given with profit in the third year. The letters should be brief, and should be written to some one whom the writer knows, and for a specific purpose. A boy, for instance, may write to his father or brother asking for something he needs. See LETTER WRITING.

Perhaps a word of caution will not be out of place at this point. While we have placed increased emphasis upon the written work for this year, we would not convey the idea that written exercises should constitute the greater part of the pupils' work in language. These exercises are a means to an end, and they should not be made burdensome. The oral work should receive by far the greater amount of time all through this and the following year.

5. *Selections for Memorizing.* The poems and stories this year should be of such nature as to strengthen the character. Longfellow's *Children's Hour, The Day Is Done, The Builders,* many of the poems of Robert Louis Stevenson and Alice and Phoebe Cary, George Macdonald's *The Baby,* and Moore's *A Visit from Saint Nicholas* are good examples of suitable poems. In addition to the history stories and biographies already referred to, *Robinson Crusoe, Hans and Grethel* and *The Ugly Duckling* are good types of tales that may be read or told.

Fourth Year. The work of this year is practically an expansion of the work of the third year. The pupil is gaining more and more from his textbooks as he learns how to use them. The work in geography should now be used as a source of new material. Children are always interested in the children of other lands, and the study of child life in other countries at this time will prove interesting and profitable.

1. *Oral Composition.* The pupils should now begin to understand the difference between telling a story and describing an object. The importance of arranging what they tell in a natural order should also be constantly kept before them. They should be asked to tell in their own words stories that they have read, to describe places they have visited and people whom they have seen. The clouds, the wind, rain, snow and storms should be studied and described. Pupils will take great pleasure in describing such events as Wolfe's capture of Quebec, Braddock's expedition, with special emphasis on the part taken by Washington, the settlement of Jamestown and Plymouth. The material for this work is so abundant that the problem for the teacher is merely one of selection.

2. *Use of the Dictionary.* The pupils should be provided with a small dictionary at the beginning of this year and should be taught how to use it. Of the many dictionaries on the market only two are worthy of consideration—*Webster's International* and the *Standard.* Small dictionaries bearing the imprint of the publishers of either of these great works are standard, differing from the larger works chiefly in amount of information they contain. The teacher should give frequent lessons upon its use until they have become familiar with the book.

3. *Study of Selections.* The school reader will furnish many valuable language lessons, since many of its selections are worthy of special study. Longfellow's *Paul Revere's Ride* is an example of such a selection. It is not enough merely to read the poem. The events of which it treats should be studied, a map of the region over which Revere rode should be drawn, and the beautiful pictures in the poem should be described by the pupils in their own words. Finally, the poem should be memorized. The course of study will determine the amount of this sort of work that can be done.

4. *Written Work.* The amount of written work should be increased and special attention should be given to the use of correct forms of verbs and pronouns, and to the common errors of speech that are likely to creep into written work. The pupil is now old enough to begin to understand why he should use certain forms and why he should never use others. The exercises should be lengthened, and the pupils should be led to rely upon themselves, but still the oral work should receive the greater amount of attention. Letter writing should be emphasized.

Fifth Year. The practical phase of the work should be emphasized throughout the year. That is, the business vocabulary of the pupils should be extended, and the correct use of common business terms, such as *merchandise, gain, loss, interest, commission* and *percentage* should be learned. Were it not for the fact that at the end of this year many of the pupils will leave school, these terms could be left

until the next year. They should be so taught as to lead the pupils to realize the vital relation between language and arithmetic. It is unnecessary to repeat here what has been said about oral and written work in the previous years. Some new phases, however. should now be introduced.

1. *Study of the Sentence.* The pupils may have learned some of the parts of speech, as *noun, verb, pronoun.* They may also have learned the parts of a sentence. Be this as it may, they should now learn the importance of the sentence in both oral and written expression—that unless one expresses himself in sentences he says nothing in speaking or in writing. Perhaps lack of sufficient drill upon the sentence is the greatest weakness in the language work of the public schools. Only the foundation facts, that the essential parts of a sentence are subject and predicate, that the subject and predicate must agree in person and number, and that in some sentences a third part, the object, must be added to complete the meaning, should be taught in this year; but these great sentence facts should be dwelt upon until the pupils thoroughly understand them. Some special drill exercises will be necessary to secure the desired results, but most of this study should be in connection with the lines of work already explained.

2. *Explanations.* Some teachers carry explanations in arithmetic to the extreme, and when explanations are mentioned they immediately think of those associated with that study. An entirely different sort of an explanation is meant here. Some boy knows how to make a kite; let him explain to the class how it is done. Assign the exercise two or three days in advance, so that he may have time to prepare for it, then expect a complete explanation, and allow the members of the class to ask such questions as may be necessary to give them a clear understanding of the subject. Ask a girl to explain how to cover a book, or to make bread; use many common occupations for material. The value of these exercises consists in the training they give in orderly arrangement of the subject on part of the pupil, in leading to conciseness and definiteness of statement and in thorough preparation on the subject. They lead the pupil to talk before the class without suffering from a self-consciousness that will deprive him of all fluency in his recitation. The explanation is the first step in a series of exercises which should lead the pupils to become so proficient in oral composition that they can discuss in public any question that they understand.

3. *Correspondence.* Letter writing should develop into correspondence this year. The lessons in geography and history may be used as the basis for this work. Pupils may write letters describing some foreign country or a distant city. The writer should assume that he is living in the place described, and he should be encouraged to put as much of his personality into the letter as he can. History pupils may assume that they are living in the time studied, as, for instance, the time of the Revolutionary War; now and then some pupil may impersonate one of the characters of history and write the class a letter expressing his views on some topic that was a live question of that day. Some such plan as this gives definiteness to the correspondence and affords excellent training in the use of the imagination.

Sixth Year. If pupils have been properly trained in English they should be able to speak and write with only occasional errors when they enter upon their sixth year's work. The errors will, in the main, be peculiar to certain pupils, and the teacher can help herself in securing their correction by keeping a sort of card index of these errors. To illustrate:

Andrew Johnson: Omits *g* from such words as *morning.* Uses *seen* for *saw* and *them* for *they.*

Tom Brown: Uses *done* for *did.* Subjects and predicates do not agree in person and number.

These cards enable the teacher to recall at a glance just what faults should receive attention in the work of each pupil, and by persistent effort she will be able to correct most of such errors during the year. The work of the fifth year should be expanded. More extended study should be given the sentence. All the parts of speech should be learned, the parts of a complex sentence studied, and the difference between complex and compound sentences should be taught.

1. *Business Letters and Forms.* The pupils should write letters applying for positions, ordering goods, asking payment for debts past due, and letters to accompany remittances in payment of bills (see LETTER WRITING, subhead *Business Letters*). Special attention should be given to form, punctuation and language. Impress upon the pupils the prestige that ability to write a good business letter gives a person. Pupils should receive such training in writing promissory notes and receipts as will enable them to write them correctly (see NOTE; RECEIPT).

2. *Talks before the School.* Great interest can be added to the morning exercises by having different pupils give talks of two or three minutes on subjects in which pupils of this grade are interested. One boy may tell how shoes are made; a girl may tell about the home of Louisa M. Alcott, and possibly describe one of her books; another may tell about the robin or some other bird common to the locality. An abundance of material for these talks may be found in these volumes. Two or three talks a week can easily be arranged. In giving them the pupil has only taken a step in advance of explaining a subject to the class, and the benefit derived from the exercise is well worth the time and effort required.

3. *The Study of Literature.* Pupils now have enough power of discrimination to study with profit some of the best literature. This will enable them to enrich their vocabularies and to become so familiar with the figures of speech that they will use them in their conversation and oral composition. Teachers sometimes fail to secure the results expected because they choose too difficult selections. A selection for critical study should be easily understood by the pupils, otherwise so much thought must be given to the interpretation that there is little left for analysis. Moreover, a thorough study of a selection which the pupil thinks he knows perfectly will usually bring out meanings that he never thought of. Bryant's *Gladness of Nature,* Lowell's *The First Snowfall* and Longfellow's *A Psalm of Life* are good examples of poems suitable for study during this year, and Hawthorne's *Tales of the White Hills,* Dickens' *Christmas Carol* and Irving's *Rip Van Winkle* and *Legend of Sleepy Hollow* serve as good examples of what may be used. Care should be taken not to make the study cover so many details that the pupils will tire of the selection before it is completed.

Seventh and Eighth Years. The additional work of these years should consist in the study of formal grammar (see GRAMMAR). Additional facilities for written and oral expression should be given. In connection with this work the word *composition* should be avoided. Pupils write without hesitation *exercises* to which their work naturally leads, but *composition* usually suggests something formal and dreadful. Doubtless they have been writing compositions all these years without realizing it.

1. *Debates.* Every boy by the time he has reached the age of twelve likes to engage in argument, so an occasional debate should constitute a feature of the seventh year's work. The argument, like the explanation, leads to logical arrangement of his discourse on part of the pupil, and also to thorough preparation. Subjects chosen should always be within the grasp of the pupils, and within the range of their interests. Such questions as why the new schoolhouse should have an assembly hall, or why the school grounds should be enlarged, will secure a lively debate in which the pupils will freely express their opinions.

2. *The Literary Society.* Much interest can be added to the work in language during the eighth year by the organization of a literary society or club, to be managed by the pupils under supervision of the teacher. For plan for organizing and conducting such a society, see PARLIAMENTARY LAW. W.F.R.

Related Subjects. The following articles in these volumes have to do with the general subject of language study. Some of them are more closely related to the more formal topic of grammar, but the line of division is not sharply drawn:

Adjective	Literature
Adverb	Mode
Article	Noun
Case	Parsing
Comparison	Participle
Conjugation	Parts of Speech
Conjunction	Penmanship
Debate	Person
Declension	Preposition
Dictionary	Pronoun
Etymology	Punctuation
Gender	Quotation Marks
Grammar	Sentence
Infinitive	Story-Telling
Inflection	Syntax
Interjection	Tense
Letter Writing	Verb

LANGUAGES OF THE WORLD. Occasionally some man appears who makes it his life work to set forth the advantages that would follow if all the world spoke one tongue; consequently, several "universal languages" have been evolved. There is Volapük, or "world speech," which dates from 1879; it was the inspiration for international congresses and found supporters in every civilized country; there is also Esperanto, which still thrives and has grammars and periodicals devoted to it; there is "idiom neutral," an outgrowth of Volapük, which is considered to be so simple that an educated reader can master it well enough to read it within a few hours.

Some of the advocates of these universal tongues are so enthusiastic and so hopeful that they believe it would actually be possible, though a slow process, to supplant other lan-

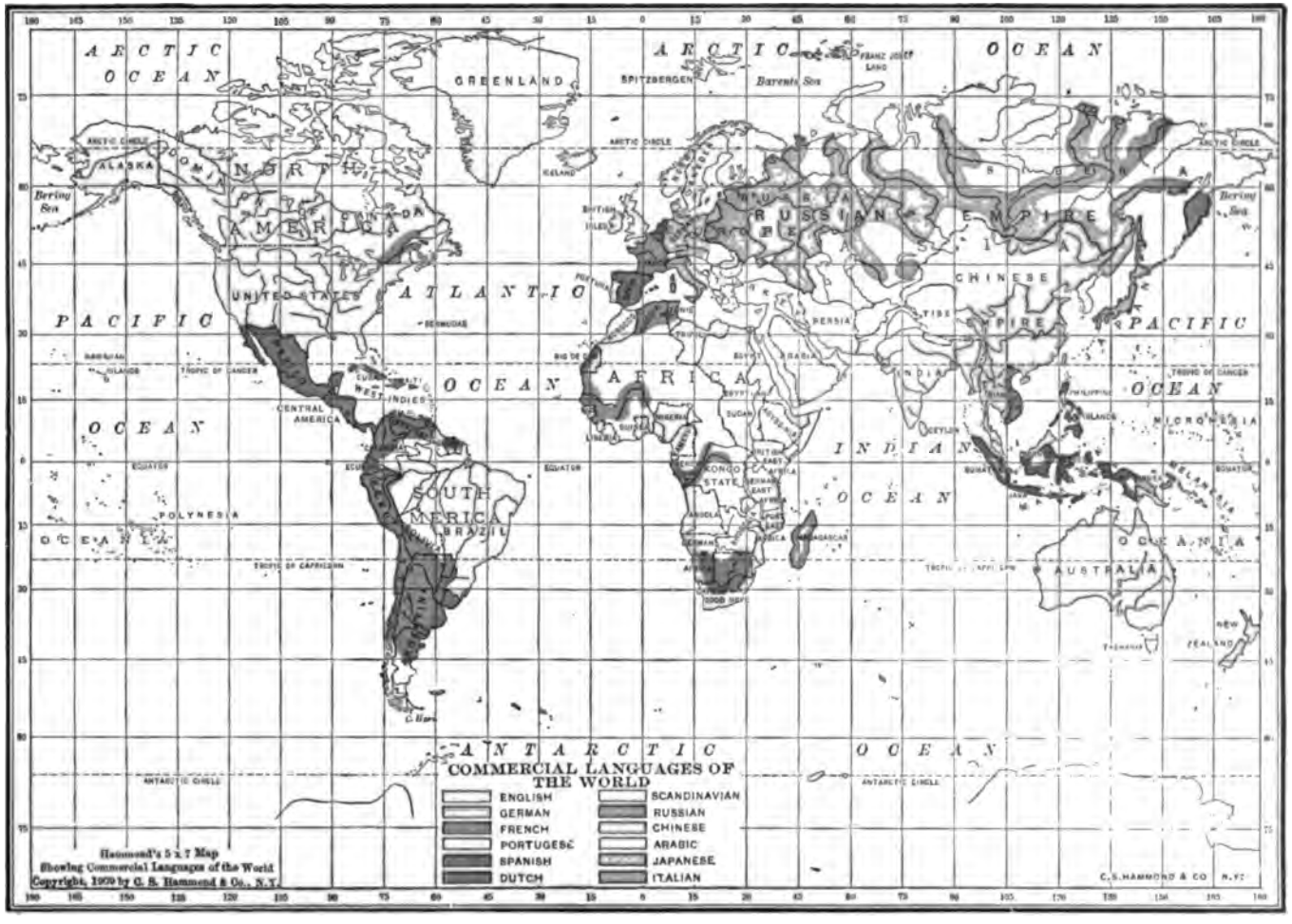
guages and in time have a real "world speech," at least for Europe and America; but the more conservative persons merely aim to produce a speech which shall be used for international purposes only and exist side by side with the languages of the various countries. But whatever the object, it has persistently failed of success. The new, invented language may be more reasonable, more logical than those already in existence, but it is not and cannot be vital. No people's life is woven into it; no contacts and withdrawals are shown in it, and the articles in these volumes on the various languages the chief characteristics of each are pointed out—the musical quality of Italian, the delicacy and precision of French, and so on.

Many men have given their lives to the study of languages, and to classifying them. There are languages in which no word has more than one syllable, like the Chinese; and on the other hand there are those, like the German, which contain ponderous words of seven or eight syllables. There are tongues, belonging almost entirely to comparatively undeveloped

LANGUAGE	WHERE SPOKEN	BY HOW MANY PEOPLE
Basque	Southern France and Northern Spain	440,000
Bohemian, or Czech	Nowhere the official language, but spoken by over 6,000,000 in Austria. The United States has the second largest number of Czechs—500,000; and Germany has 125,000	7,100,000
Bulgarian	Bulgaria and Eastern Rumelia	5,650,000
Chinese	China. Of course there are in this vast country many dialects	400,000,000 (estimated)
Danish	Denmark and Northern Schleswig	about 3,500,000
Dutch	Netherlands, and by the Boers of South Africa. The language of these latter is, however, a strongly marked dialect	6,000,000
Egyptian	Egypt. Almost one-tenth of the population, Arabs, Turks, Greeks, British, speak other languages	about 10,500,000
English	The United Kingdom, Canada, the United States, Australia, and officially, in the various British colonies, as India, South Africa	160,000,000 (at least)
Flemish	Northern provinces of Belgium	about 3,500,000
French	France and its colonies. There are also about 3,000,000 French-speaking people in Belgium, about 750,000 in Switzerland, and about 2,125,000 in Canada	52,000,000 (at least)
German	German Empire, Luxemburg, Switzerland, and parts of Austria-Hungary. There are also many German-speaking people in other countries, as Russia and the United States, so that the total is about	80,000,000
Greek	Greece, large parts of Asia Minor, Cyprus, Crete	about 9,000,000
Hindustani	Northern India	100,000,000
Italian	Italy, with its islands, and some parts of Austria, Switzerland and France	37,000,000
Japanese	Japan	53,000,000
Norwegian	Norway	2,400,000
Persian	Persia	9,500,000
Polish	The regions comprising the former kingdom of Poland, but now part of Russia, Austria-Hungary and Prussia. There are also about 1,000,000 Polish-speaking people in America	16,000,000
Portuguese	Portugal, Brazil and various Portuguese colonies	26,200,000
Russian	Russian Empire and parts of Galicia and Hungary	95,000,000
Serbo-Croatian	Serbia, Montenegro, Croatia, Slavonia, Bosnia and Herzegovina, and Southern Hungary	8,000,000
Spanish	Spain, Mexico, Central America, much of South America, the Philippines and the Antilles	50,000,000
Swedish	Sweden	5,500,000

there remain, instead of the *language* of the world, the *languages* of the world, as sharply differentiated as ever in their history. For each expresses in a large degree the genius and spirit of the people who built it.

Kinds of Languages. The fact stated above will bear emphasis—that the history of a people is legible in its language; and the greatest nations, those which have swayed the destinies of the world, have fashioned the greatest languages. The language of Greece was exquisite, musical, as truly a work of art as any statue ever hewn from marble; the Roman language was strong, compact, as capable of accomplishing its purpose as was the Roman legion. In peoples, which make use of but a few sounds, and there are others, as English, which have more than twoscore. Then there are divisions according to grammatical structure, as languages which inflect their words to show varying relations, and languages which have slight inflection or none at all. However, all of these technical distinctions are the province of the scholar; the ordinary reader, even the ordinary student, has little interest in them. On the other hand, he is interested in such questions as, How many languages and dialects are there in the world? How many sounds or articulations are there in all of them? Which language is spoken by the most people? Which


ARCTIC OCEAN
GREENLAND
SPITZBERGEN
Barents Sea
FRANZ JOSEF LAND
NOVAYA ZEMLYA
ARCTIC CIRCLE
ALASKA
Bering Sea
NORTH AMERICA
ICELAND
BRITISH ISLES
RUSSIA
RUSSIAN EMPIRE
SIBERIA
CHINESE EMPIRE
UNITED STATES
ATLANTIC OCEAN
PACIFIC OCEAN
BERMUDAS
BAHAMAS
TROPIC OF CANCER
CENTRAL AMERICA
WEST INDIES
EQUATOR
AFRICA
PERSIA
ARABIA
EGYPT
INDIA
CEYLON
PHILIPPINES
MICRONESIA
SOUTH AMERICA
BRAZIL
POLYNESIA
OCEANICA
TROPIC OF CAPRICORN
AUSTRALIA
NEW ZEALAND
C. Horn
ANTARCTIC OCEAN
ANTARCTIC CIRCLE
COMMERCIAL LANGUAGES OF THE WORLD
ENGLISH
GERMAN
FRENCH
PORTUGESE
SPANISH
DUTCH
SCANDINAVIAN
RUSSIAN
CHINESE
ARABIC
JAPANESE
ITALIAN
Hammond's 5 x 7 Map
Showing Commercial Languages of the World
Copyright, 1909 by C. S. Hammond & Co., N.Y.
C.S. HAMMOND & CO N.Y.

is spoken in the most countries? Which is spreading most rapidly?

First of all, it is estimated that there are in the world over 5,000 languages and dialects. Certain of the dialects, to be sure, differ from each other very slightly, but some of the languages are as far apart as is civilization from savagery. And in all these tongues there are no fewer than 300 different articulations—300 ways in which the vocal organs must be used to produce sounds. Some of the more primitive tongues make use of but a very few, sounding to the unaccustomed ear almost like a series of grunts; while English, on the other hand, uses almost fifty. Probably no language, unless it was the ancient Sanskrit, has ever made use of more.

The Chief Languages. As to the number of people speaking the various important tongues, and the countries in which they are spoken, the table on page 3326 gives such information in compact form. No account is taken of the languages of savage tribes, which have received comparatively little study, and concerning which no estimates can be given.

From this table it may be seen that Chinese is spoken by more people than any other language in the world. English ranks next, and is thus first among the European languages. Of these Russian is second and German third, but both of these are less widespread than Hindustani.

It is an interesting fact that the languages of all the most important peoples of the world, except the Chinese and Japanese, belong to one great family, the Aryan or Indo-Germanic group of languages. Tongues as different as Hindustani, Russian and English are all members of this group, which includes every tongue of Europe except the Basque, which is unrelated, so far as anyone knows, to any other language. *Ex oriente lux,* a popular saying meaning *Light out of the East,* may thus apply not only to religion but to language as well, for just as every great religion of the world originated in Asia, so, it is believed, did the one parent tongue from which all the Aryan languages are sprung have its first home in Asia, the continent of beginnings. A.MC C.

Related Subjects. The important languages of the world are treated in separate articles in these volumes:

Bengali
English Language
Esperanto
Flemish Languages and Literature
French Language
German Language
Greek Language
Hebrew Language and Literature
Hieroglyphics
Italian Language
Latin Language
Plattdeutsch
Provençal Language and Literature
Romance Languages
Sanskrit Language and Literature
Sign Language
Syriac
Volapük

LANIER, *la neer',* **SIDNEY** (1842-1881), the greatest poet of the South since Edgar Allen Poe. He is called the "sunrise poet," so deeply did he love and so truly did he interpret the freshness, the hush, the misty twilight spell of the early morning hours. His verse was the product of his theory that poetry, like music, should appeal to the ear, and like that of Poe it represents a melodious blending of sound and sense. He was a prose writer of note also, and is known to children for his adaptation of the *Mabinogion,* the chronicles of Froissart, and the story of King Arthur, and for such delightful sketches as *Bob: The Story of Our Mocking Bird* and *The Story of a Proverb.* His fame has grown steadily since his death, and the North as well as the South honors his genius.

Lanier was born in Macon, Ga., and educated at Oglethorpe College, in that state. During the War of Secession he fought on the Confederate side, and while a prisoner he wrote some of his first verses. From the exposures and hardships of war he developed consumption, which he fought heroically into middle life, but it finally caused his death.

His literary career began in 1867, with the publishing of an unsuccessful novel, *Tiger Lilies,* founded on his war experiences. One of his first poems, *Corn,* appeared in *Lippincott's Magazine* in 1875 and attracted so much attention that he was asked to write the words to a cantata composed by Dudley Buck and sung at the Centennial Exposition. The first complete edition of his poems appeared in 1876. In 1879 he was appointed lecturer on English literature at Johns Hopkins University, and during his engagement there he published two critical volumes of considerable importance: *Science of English Verse* (1880), and *The English Novel and the Principles of Its Development* (1883). The latter is composed of lectures delivered at Johns Hopkins at a time when he was so weak he had to sit during his talks.

Lanier's finest and most spiritual work is the *Hymns of the Marshes,* two of which, *Sunrise* and *The Marshes of Glynn,* are the wonderful imaginative songs of a dying man. These *Hymns* rank among the best productions of American poetry. His *Song of the Chatta-*

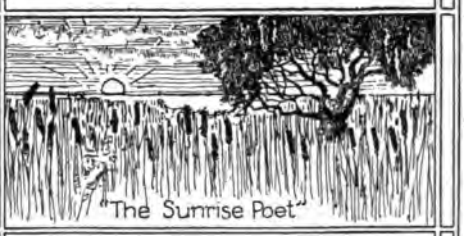
Cottage in which Lanier passed his last days

Lanier's Birthday

SUGGESTIVE PROGRAM

The program as here given is of course too long. It will be necessary to make selection.

Song, *Ballad of Trees and the Master* ..... *Lanier*
Roll Call, Quotations from Lanier
Owl against Robin ..... *Lanier*
Essay, *Sketch of Lanier's Life*
The Tournament ..... *Lanier*
By two pupils
Reading, *The Story of a Proverb* ..... *Lanier*
Barnacles ..... *Lanier*
Essay, *Comparison of Lanier with Other Southern Poets*
Essay, *Lanier the Musician*
Song of the Chattahoochee .... *Lanier*
Essay, *Heroes of Peace*
The Better Way ..... *Susan Coolidge*
Reading, *Bob: The Story of Our Mocking Bird* ..... *Lanier*
The Hard Times in Elfland .... *Lanier*
Essay, *The Founding of the Round Table*
Character Sketch of King Arthur
Life and Song ..... *Lanier*
The First Steamboat Up the Alabama ..... *Lanier*
Essay, *Description of the Marshes of Glynn*
Tampa Robins ..... *Lanier*
Dying Words of Stonewall Jackson ..... *Lanier*
Essay, *What Lanier Stands for in the Life of the South*



"The Sunrise Poet"

hoochee, A Song of the Future, A Song of Love, An Evening Song and others are songs in the true, literal sense.

The following lines from his *Marshes of Glynn* are representative of the quality of his verse:

And what if behind me to westward the wall of the wood stands high?
The world lies east: how ample, the marsh and the sea and the sky!
A league and a league of marsh-grass, waist-high, broad in the blade,
Green, and all of a height, and unflecked with a light or a shade,
Stretch leisurely off, in a pleasant plain,
To the terminal blue of the main.

LANSDOWNE, *lanz'doun,* HENRY CHARLES KEITH PETTY-FITZMAURICE, Fifth Marquis of (1845-), a contemporary British statesman, one of that small group of men who are taught from boyhood to take a leading part in public life. He was educated at Eton and at Balliol College, Oxford, and succeeded to the family estates and titles in 1866, when he was only twenty-one. Thus elevated to the House of Lords at an age when most young men are finishing their schooling, he lost no time in making his influence felt. In various Liberal Ministries he was in turn a Lord of the Treasury (1869-1872), Undersecretary of State for War (1872-1874) and Undersecretary of State for India (1880). His resignation from the last office was a sharp protest against Gladstone's policy toward Ireland, and when Gladstone in 1886 finally espoused Home Rule, Lansdowne was one of those who joined the Liberal Unionist party.

LORD LANSDOWNE

In the meantime Lansdowne had been appointed Governor-General of Canada to succeed the Duke of Argyle (Marquis of Lorne). His tenure of this office, from 1883 to 1888, was marked by considerable internal progress, notably the completion of the Canadian Pacific Railway. The Saskatchewan, or Riel, Rebellion and the arbitration of the fisheries dispute with the United States were other noteworthy features. After five years in Canada Lansdowne spent five years in India as Viceroy.

From 1895 to 1900 he was Secretary of State for War in Salisbury's Cabinet, and from 1900 to 1905 was Secretary for Foreign Affairs. His service at the Foreign Office was marked by the alliances with Japan and France.

After 1905 Lansdowne became leader of the Unionist opposition in the House of Lords. Although nominally a Liberal in early life, he was temperamentally conservative, a fact which was strongly revealed in 1909, when he bitterly opposed the Lloyd George budget, and in 1916, when his opposition defeated Lloyd George's compromise of the Home Rule question. In May, 1915, Lord Lansdowne entered the coalition Ministry, formed by Premier Asquith, as Minister without portfolio. With the fall of the coalition Cabinet and the ascendancy of Lloyd George, Lord Lansdowne retired to private life. If his half century of public service did not give him a place in English history as the equal of Gladstone or Disraeli, it at least entitles him to high rank among those men who have given their lives in public service. C.H.H.

LANS'FORD, PA., a borough in Carbon County, situated in the eastern part of the state about midway between the northern and southern boundary lines. It is forty-four miles north of Reading and on the Pennsylvania and the Central of New Jersey railroads. The prosperity of Lansford is derived mainly from the productive anthracite-coal district in which it is located. Besides its extensive coal-mining interests, it has manufactories of garage supplies, shirts and silk knit goods. An immense electric-power plant is located about a mile from the borough. Lansford was settled in 1845 and was incorporated in 1876. In 1910 the population was 8,321; in 1916 it was 10,477 (Federal estimate).

LAN'SING, MICH., the capital of the state and the county seat of Ingham County, is situated south of the geographical center of the state, at the point where the waters of the Grand and Cedar rivers meet. Detroit is eighty-five miles southeast and Grand Rapids is sixty-four miles northwest. Transportation is provided by the Grand Trunk, the Michigan Central, the New York Central, the Pere Marquette and the Michigan United Traction Company. The first settlement on the site was made in 1837; it was chosen for the state capital in 1847, chartered as a city in 1859 and rechartered in 1897. The population in 1910 was 31,229; it had increased to 40,498 by 1916 (Federal estimate).

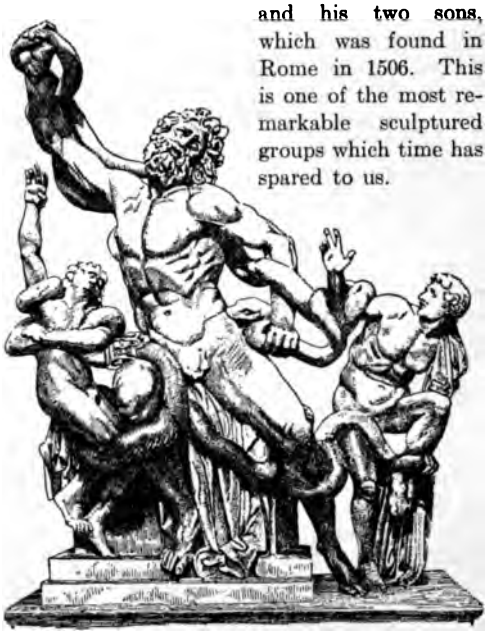
At Lansing the rivers are spanned by several bridges. In its course through the city the Grand River winds around the business section. In a park of ten acres stands the imposing state capitol, which was completed in 1879 at a cost of $1,500,000; its library contains 105,000 volumes. Other noteworthy buildings are the government building, Elks' Home, Masonic Temple, Union Depot and Y. M. C. A. quarters. Lansing has the state school for the blind, state industrial school for boys, state reform school and the state agricultural college. The latter, which is the oldest agricultural college in the United States, has connnected with it an agricultural experimental farm of 675 acres. A United States Weather Bureau station is also located here.

For recreation centers the city has Waverly Park and Pine Lake, both summer resorts, and seven other parks. Lansing is a trade center of importance in its territory. Ample water power for manufacture is supplied by the rivers, the Grand River having a fall here of about twenty feet. The largest industrial plants make automobiles, farm implements, engines, furniture, wagons and silk and woolen goods. The automobile industry is particularly important.

LANTERN FISH, a large group of deep-sea fish, whose distinguishing characteristic is the presence of light-giving organs along the sides of the body, which may be either in the head or near the tail. Living as they do in the depths of the ocean, it appears that they have been provided by nature with the light necessary for them. Many lantern fish are extraordinarily grotesque in appearance, with enormous heads and huge mouths armed with large teeth. A lantern fish about a foot long, which dwells along the Grand Banks of Newfoundland, is commonly known as the *viper fish,* because of its long, slender, snakelike body. One of the most curious of these oddly-formed fish is to be found only at great depths; it resembles a whale in shape and color, but is less than six inches in length.

LAOCOÖN, *la ok'o on,* in ancient classic legend, a priest of Neptune or Apollo, who warned his Trojan countrymen against bringing into the city the wooden horse by which Troy was captured (see TROY; WOODEN HORSE). The goddess Minerva, to whom the Greeks had consecrated the wooden monster, in revenge for his warning caused two snakes to come out of the sea. They first twined themselves around the two sons of Laocoön, and when he vainly endeavored to save them the serpents attacked

him and crushed him to death. Vergil's description of the death of Laocoön, given in the second book of the *Aeneid,* was probably inspired by the marble group of the Trojan priest and his two sons, which was found in Rome in 1506. This is one of the most remarkable sculptured groups which time has spared to us.



THE LAOCOÖN GROUP
In the Vatican, Rome.

LA PAZ, *lah pahz'*, a plateau city of 80,000 people in 1915, the legislative and executive capital of the republic of Bolivia. It is 12,120 feet above the sea level. It is 719 miles from Antofagasta, Chile, and 496 miles from Mollendo, Peru. Originally named in 1548 to commemorate the reconciliation between Pizarro and Almagro (for the name means *the peace*), it was rechristened La Paz de Ayucho in 1825 to commemorate the decisive battle for independence. The latter is its legal name to-day.

La Paz has been called the most cosmopolitan city of a mining country in all the world; people of all nations are there. Describing its approach, Charles M. Pepper says, "La Paz spreads along the inner sides of a rocky amphitheater, a panorama of red roofs, blended blue and white buildings, church towers and parks of willow and eucalyptus trees." The city has public squares and a boulevard, and the River La Paz winds through it.

Much unfriendly comment has been made upon its daily extremes of temperature, its narrow, ill-paved streets, its defective drainage, imperfect sanitation and its high death rate. La Paz is not the seat of either the supreme court or the archbishopric, both of which are at Sucre. However, popular interest attaches to its cathedral, dating from the seventeenth century, the University of San Andres, the national college, the national museum, a famous statue of Bolivar, the panoramic scenery of the approaches and the wireless communications established in 1915. The American Institute, begun in 1912, conducted by a faculty from the United States under patronage of the state government, is well attended. The university includes a modern commercial college. There is a lyceum for girls, founded in 1907.

LAPIDARY, *lap'i da ri,* from the Latin word *lapis,* meaning *stone,* is the name applied to one who cuts and polishes gems. Over sixty centuries ago lapidaries flourished in Assyria, Babylonia and Egypt, the earliest work in stonecutting being done with the *sapphire point.* About 3000 B. C. the *bow drill* was introduced, a device employed also by the American Indians. Previous to the fourteenth century gems were for the most part cut *en cabochon;* that is, polished smooth, with the original size and color of the stone retained as far as possible. The practice of cutting on the surface of the gem flat faces having a geometrical arrangement, or *faceting,* is of modern origin. Transparent gems, such as diamonds, are usually *faceted* because the reflection and refraction of light on their surfaces give them additional brilliancy. Opals, moonstones, turquoises and other opaque and translucent stones are cut *en cabochon.* Modern gemcutters use a lathe carrying a point or disk of soft iron, coated with diamond dust and oil. See Gems.

LAPIS LAZULI, *la'pis laz'u lie,* or **LAZURITE,** *laz'u rite,* a mineral whose beautiful azure-blue color makes it of value for ornamental purposes. It is composed chiefly of aluminum, sodium, silica and sulphur, and is found both in massive form and in crystals, in granite and in limestone. Some varieties show green, violet or red tints, and occasionally lapis lazuli is found which is flecked with brilliant spots suggesting the stars shining in the blue firmament. The Egyptians made use of this mineral in their jewelry, and the Romans called it *sapphire.* Modern nations have employed it in ornamental and mosaic work, and in the construction of altars and shrines. Formerly, it was the only source of the paint *ultramarine,* but it has been replaced for that purpose by an artificial product. The ancients,

who believed that it possessed medicinal value, ground it to powder and then mixed it with milk, forming a dressing for boils and ulcerations. The best specimens come from China, Siberia, Persia and Chile. See GEMS; ULTRAMARINE.

LAPLACE, *la plahs'*, PIERRE SIMON, Marquis de (1749-1827), the most famous of French astronomers, called "the Newton of France" and "the greatest mathematician of his age." To him the world is indebted for a series of brilliant discoveries in regard to the theory of planets, the question of tides and the problem of the stability of the solar system. Especially is his name connected with the world-famous theory of the origin of the solar system, known as the nebular hypothesis (which see), now largely discredited.

Laplace was the son of a poor farmer of Beaumont-en-Auge, and it was through generous friends that he was able to attend the College of Caen and the Military School at Beaumont. When only twenty years old he became professor of mathematics in the Military School of Paris, and from that time on he advanced steadily in fame and in position. Elected one of the "forty immortals" of the French Academy in 1816, Laplace before his death became a member of nearly every learned society in the world. His most celebrated work, the *Celestial Mechanics,* is a masterpiece of scientific writing. Of almost equal merit is his *Exposition of the System of the Worlds,* in which he set forth the nebular hypothesis.

LAP'LAND, a land of continuous cold, in Arctic Northwestern Europe, so called because it is the home of the people known as Lapps. It is a bleak land where the struggle for a livelihood is difficult; but the Lapps, though the smallest people of Europe, have great endurance and usually live in happiness and contentment.

Lapland really belongs to three countries—Norway, Sweden and Russia. On the north is the Arctic Ocean, on the east the White Sea, and on the west the Norwegian Sea. The southern boundary is indefinite, but Lapland's area of about 150,000 square miles consists of the Norwegian provinces of Nordland, Tromso and Finmarken; part of Sweden's province of Norrland and all of Norrbotten; Northern Finland and the Kola Peninsula, which belong to Russia.

The People and Their Mode of Living. In a land where there are nine months of extreme cold every year, where vegetation consists of little but mosses, lichens and sparse growths of birch, pine and fir, life must of necessity be difficult to maintain. In this land where in the extreme north there are two months of continuous daylight and two months of unbroken darkness, live a strange little people numbering about 25,000. They are small, averaging less than five feet in height, muscular, large-headed, with low foreheads, high cheek bones, flat features, and lips straight and thin. Their hair is black and straight, their faces yellow. Year in and year out they wear their garments of wool and reindeer skins, never removing them until they need new ones, seldom washing even their faces. They are dirty, yet healthy; uneducated, but, perhaps because of their ignorance, contented and merry-hearted. They can, however, be cruel and selfish, for many of them have a great love of money and drink.

LOCATION MAP

There are three groups of Lapps. The *Mountain Lapps* live a wandering life, moving from place to place with their herds of reindeer, pitching their tents wherever herbage is plentiful, and, as described in the lines by James Thomson—

> The reindeer form their riches; these their tents,
> Their robes, their beds, and all their homely
> wealth supply.

The children of the Mountain Lapps, who know nothing of the happy, care-free life of boys and girls in lands to the south of them, seem like little old men and women, for they must early do their share in the work of the household. In one cone-shaped tent the entire family, including dogs, live, eat and sleep. These simple people pass an uneventful existence, content to rove from place to place,

living chiefly on reindeer-meat, cheese and reindeer-milk and drinking melted snow, and cheerfully fighting the elements of snow, rain and winds.

The *Sea Lapps* are more numerous than the Mountain Lapps. They live along the coast in rude huts of wood and sods, and their principal occupation is fishing. Their life is more even, and a number of families build their homes close together to form little settlements. The *River Lapps* are perhaps the most progressive. They live in settlements on river banks, and fish, hunt, keep reindeer, cows and sheep and do a little farming.

The language of the Lapps is similar to Finnish. Most of the people profess Christianity, and they travel many miles in their reindeer-sledges to attend the churches.

Economic Resources. The most valuable resource of the entire Lapland region consists of the beds of iron ore in Southern Swedish Lapland, which are among the best and most extensive in the world. Mines are being worked at Gellivare and Kirunavaara. A 280-mile railroad has been built from Lulea, a port on the Gulf of Bothnia, to Gellivare, forty-four miles north of the Arctic Circle, and across Lapland to Victoria Haven, to reach an ice-free port for the export of ore to England and Germany. Over 4,000 tons are produced annually. M.S.

Consult Walter's *Norse and Lapp;* Fulton's *With Ski in Norway and Lapland.*

LA PLATA, *lah plah'ta,* the capital of the Argentine province of Buenos Ayres, South America. It was founded in 1882, after the city of Buenos Ayres, from which it is about thirty-two miles southeast, had been made the federal capital. The city has enjoyed rapid growth, and enterprise is apparent everywhere in its well-paved streets lined with modern shops, its many fine open squares, and its numerous public buildings. The capitol and other buildings of the provincial government, the observatory and the fine new railway station are especially noteworthy. The harbor at La Plata is joined by a canal to a larger outer harbor at Ensenada, on the estuary of the River La Plata. The manufacture of cotton and woolen tissues is extensively carried on. Population, 1912, 106,380.

LA PLATA, Rio de. See Plata, Rio de la.

LA PORTE, *lah port',* Ind., an industrial city which enjoys popularity as a summer resort, situated in the northwestern part of the state twelve miles from Lake Michigan. It is the trade center of La Porte County, of which it is the county seat. Michigan City is twelve miles northwest, South Bend is twenty-eight miles east and Chicago is sixty miles northwest. The city has railway accommodations through the New York Central, the Lake Erie & Western and the Pere Marquette railroads, and interurban electric lines connect with Elkhart, South Bend, Michigan City and Chicago. The first settlement was made in 1830; it was incorporated as a town in 1835 and as a city in 1852. Germans, Poles, Greeks and Jews form a large part of the population, which increased from 10,525 in 1910 to 13,202 in 1916 (Federal estimate). The area of the city is a little more than three square miles.

La Porte is like a natural park set close to a chain of lakes, and near-by boating and fishing facilities have made it an attractive summer resort. In the winter these lakes furnish large supplies of ice, most of which is shipped to Chicago. Fox Memorial and Bluffside are attractive parks within the city. La Porte has extensive industrial establishments, the most important being sawmills and braiding mills, foundries, machine shops, breweries and cooperages; there are also manufactories of furniture, woolen goods, pianos, threshing machines, flour and brooms. Among the notable buildings are the Federal building, a fine courthouse, a city hall, the Association House for women and girls and the Ruth Sabin Home. Besides its public schools, the city has Saint Rose's Academy, a business college and a public library.

LAPRAIRIE, *la pra'ree,* the county town of Laprairie County, Quebec, on the south shore of the Saint Lawrence River, near the Lachine Rapids and six miles south of Montreal. It is on the Grand Trunk Railway and has ferry service to Montreal. It is a popular summer resort, but is also important for its saw and carding mills, tannery, creameries and canneries. The first railway in Canada was built in 1836 from Laprairie to Saint Jean (Saint John). Population in 1911, 2,388; in 1916, about 3,000.

LAP'WING, a crested plover, one of the commonest and best-known birds of Western Europe, especially in the British Isles, where it is resident the entire year. It is partly bronze green in color, with the throat and breast blue-black and the sides of the head and neck and the underparts white. When on the ground it has a handsome and graceful appearance, but in flight it has an awkward, flapping movement, which gives it its name. It is also called the *peewit,* from its shrill, wailing cry. The

lapwing has the habit of pretending to be lame or hurt when its nest or young are approached, by this ruse luring the intruder off to a safe distance. Its nest is a depression in the soil and contains four olive-green eggs, thickly spotted with black and brown. The eggs are considered a great delicacy, and are gathered and sold in city markets.

THE LAPWING

Lapwings are only accidental in North America. In South America is found a species known as the *Cayenne lapwing,* groups of which have been observed going through a singular marching movement, like a children's game. Another interesting lapwing is the *crocodile bird* of Egypt, which, from the time of Herodotus, has been known as the companion of the crocodile, removing for food the bugs, leeches, etc., that find lodging on the monster's skin and, in turn, warning it of approaching danger. In this characteristic it is much like the rhinoceros bird (see RHINOCEROS). Lapwings are also found in Arabia, Persia, India and Ceylon.

LARAMIE, *lair'a mi,* WYO., the county seat of Albany County, is situated in the southeastern part of the state, on the great Laramie Plains, partially surrounded by the Medicine Bow Mountains on the west and the Laramie Range on the east. The elevation is 7,165 feet. Cheyenne is fifty-seven miles southeast and Denver is 132 miles south and east. Laramie is on the Big Laramie River and on the Union Pacific and the Colorado, Wyoming & Eastern railroads. The Laramie, Hahn's Peak & Pacific Railway is a local line running westward to the hunting and fishing resort of the Medicine Bow Mountains and North Park. The area of the city is nearly two square miles. In 1910 the population was 8,237; it was 8,257 in 1916 (Federal estimate).

Here is located the University of Wyoming, with its several colleges, including the state normal school, the school of mines and engineering and the agricultural college; the United States experiment station and a fish hatchery are government enterprises. Among the more prominent buildings are a Federal building, erected in 1906 at a cost of $120,000; a Carnegie Library and a Masonic Temple. Laramie is the see of the Episcopal Church in Wyoming.

This city is the supply and trading center of a large stock-raising and mining region. Extensive irrigation projects are rapidly developing agriculture; already alfalfa, grains and potatoes are successful crops. In the vicinity are found extensive deposits of soda, lime, sand, coal, oil and natural gas; there is also considerable gold and silver, lead, copper, iron and graphite. Three large cement and plaster mills are supplied from huge plaster deposits near the city. Other industrials include stock yards, railway and machine shops and an ice plant.

A settlement made here in 1868 was named in honor of Jacques La Ramie, a French trapper. It was chartered as a city by the legislature of Dakota in 1868, and rechartered by the legislature of Wyoming in 1873.

LARCENY, a form of theft, consists in dishonestly taking away the personal goods of another. Its exact definition varies according to local statutes. In some states and provinces larceny is divided into two classes, *grand* and *petit.* In grand larceny two degrees are sometimes distinguished, usually as follows: the *first,* larceny in the night, or larceny of property worth more than five hundred dollars; the *second,* larceny of property worth more than twenty-five dollars and less than five hundred dollars. *Petit larceny* includes taking of property of less than twenty-five dollars in value. *Grand larceny* is usually punished by imprisonment, *petit larceny* by fine or imprisonment. Until 1827 some forms of larceny in Great Britain were punishable by death. Larceny is usually distinguished from ROBBERY; BURGLARY; EMBEZZLEMENT; see the articles under those heads. R.E.B.

LARCH, the name of a group of trees belonging to the cone-bearing family (coniferae). There are three North American species: the *tamarack,* sometimes called *hackmatack,* the *Western larch* and the *Alpine larch.* They are slender, conical trees, varying from fifty to 250 feet in height, with branches which in old trees droop toward the ground. The bark, which is used in tanning and dyeing, is thin and scaly. Leaves or needles are clustered in little sheaths on short spurs. Flowers of two sorts come from some of the buds, while others produce crowded tufts of needles. The tough roots of the larch were used by the Indians to bind up their canoes, as Longfellow tells us in *Hiawatha:*

Give me of your roots, O Tamarack!
Of your fibrous roots, O Larch-Tree!
My canoe to bind together.

Larch wood, which contains a great deal of resin but does not burn readily, is tough and durable, and timbers of it in old French castles have been found perfectly sound when stones

THE LARCH
Tree and detail of branch.

of the building were crumbled and decayed. It is widely used for telegraph poles, ship masts, railroad ties and fence posts, and yields a large percentage of excellent lumber which is, however, difficult to dry.

Of a total amount of nearly 410,000,000 feet of larch lumber cut in the United States annually, the contributions of various states are practically as follows, the figures representing per cent:

Montana	30	Washington	7
Idaho	28	Michigan	7
Minnesota	17	Oregon	3
Wisconsin	8		

About 100,000,000 board feet of tamarack are produced each year in Canada. The most important commercial use of the wood in that country is for making railroad ties.

LAR'COM, LUCY (1826-1893), an American poetess, was born at Beverly, Mass. After three years in school she became a factory employee in the cotton mills at Lowell. Her contributions to the *Lowell Offering,* a periodical for the mill employees, attracted the attention of John Greenleaf Whittier, with whose assistance she afterwards compiled *Child-Life* and *Songs of Three Centuries.* For three years she attended the Monticello Female Seminary in Illinois, then returned to Massachusetts and taught in the Norton and Boston schools. In 1865 she became assistant editor, and in 1866 editor, of *Our Young Folks,* a magazine since absorbed by *Saint Nicholas.* Her writings include *Similitudes, Ships in the Mist* and *Wild Roses of Cape Ann.*

LARD, or hog fat, is a substance used extensively for cooking, for soap making, as a lubricant and in the preparation of ointments. It is extracted from the fatty parts of the hog by melting in kettles. When brought to a high temperature it is strained, then cooled by refrigeration and clarified. Lard intended for culinary purposes—for making of biscuits, pie crust and other pastry, and for frying foods of various kinds—is run into pails just before it solidifies. The finest lard, called *leaf lard,* obtained from the fat around the kidneys of the hog, is used both in cooking and in the preparation of oils and ointments. When the fat is subjected to pressure a substance known as *olein* is liberated in the form of lard oil, which is used extensively for lubricating machinery.

On the farm the hog fat is cut into small pieces, put into kettles over bonfires and heated until the grease is entirely dissolved from the tissues, or "cracklin," when it is run into vessels to cool. The fat around the kidneys, which is removed from the hog in large, irregularly-shaped pieces, is often bought by the housewife who prefers to render it into lard herself, so she may be sure that the cooking fat is not adulterated. She wastes very little in buying leaf lard, as the tissues, which are left after the lard is extracted, weigh very little.

Lard is composed of *olein, stearin* and *palmitin,* in the proportion of sixty-two per cent of olein to thirty-eight per cent of the other ingredients. As a food it is wholesome, and when fresh is mild in flavor and pleasing in odor.

LAREDO, *la ra'doh,* TEX., the county seat of Webb County, situated on the Rio Grande River, the International boundary line, opposite Nuevo Laredo, Mexico. It is about 125 miles from the Gulf of Mexico and 150 miles southwest of San Antonio, and is on the International & Great Northern, the National of Mexico and the Rio Grande & Eagle Pass railroads. The population, which in 1910 was 14,855, was 15,749 in 1916 (Federal estimate). Interesting features of the city are the Federal building, courthouse and jail, city hall, the market, Mexican National Hospital and Mercy Hospital and an old Spanish cathedral. There is a railroad bridge across the Rio Grande. Loma Vista Park is an attractive pleasure re-

sort of sixty-five acres, and immediately west of the city is a United States military post, Fort McIntosh. The chief institutions are the Laredo Seminary (Methodist Episcopal) and Ursuline Academy and Convent.

Laredo is the commercial center of a productive agricultural section, irrigated from the Rio Grande, and is in an extensive stock-raising country. Mineral deposits, especially coal and iron, are a part of the wealth of the community. The annual international trade in imports is sometimes more than $2,500,000, and exports often reach $14,000,000. The chief crop is Bermuda onions; live stock and wool, brick and coal are also exported. The industrial plants of the city include foundries, car and machine shops, sheet-metal works, broom and mattress factories, concentrating and sampling works, stockyards and a hide establishment.

A mission for the native Indians was established at Laredo a number of years before the first permanent settlement, which was made by the Spaniards in 1767. It was incorporated about 1848.

LARES AND PENATES, *la'reez, pe na' teez,* in ancient Roman mythology, the deities who were supposed to watch over the destinies of the family and state, and who were usually represented by small images in the hearth or in a special shrine. These images were the most cherished possessions of a household, and a place was always provided for them in a new home before the comfort of the family was considered. The Lares were supposed to be the spirits of deceased mortals who returned to watch over their families and friends, whose homes they guarded from exterior dangers; the Penates had always existed as deities, and protected the interior of the home. Originally the divinities were separate and distinct, but later were connected to denote the worship of ancestors and the hearth. In modern times the terms are commonly used to designate one's home or household possessions.

LARK, a family of birds found in Europe, Asia, Africa and America, noted for sweet singing and remarkable powers of flight. About 100 species have been identified, best known of which are the *skylark,* which nests throughout Europe and the temperate parts of Asia, and the *horned lark,* the only member of the family native to America. The *titlark* and *meadow lark* are not true larks, but belong to entirely different families. See MEADOW LARK.

The skylark, whose song may be heard when the singer itself is lost in the depths of the sky, is the theme of one of Shelley's most exquisite poems. Hardly more joyous is the singing of the skylark than the poet's melodious lines:

Hail to thee, blithe spirit!
Bird thou never wert—
That from heaven or near it
Pourest thy full heart
In profuse strains of unpremeditated art.

Higher still and higher
From the earth thou springest,
Like a cloud of fire;
The blue deep thou wingest,
And singing still dost soar, and soaring ever singest.

This bird was also the inspiration of a beautiful painting by the French artist Jules Breton—*The Song of the Lark.* It now occupies an honored place in the Art Institute of Chicago; a faithful reproduction in color appears in these volumes, opposite page 916.

This sweet songster is a modest little bird, about seven inches long, clothed in a yellowish-brown coat streaked with dark brown. It is dull white on the underparts. It has the peculiar foot structure characteristic of the lark family, the hind toe being provided with a long, straight claw. It usually nests in the open field, laying four or five dull-gray eggs, marked with olive-brown, and it raises two broods a season. The skylark has been naturalized in Long Island.

The horned larks are found in the northern parts of both the Eastern and Western hemispheres. They breed throughout Canada and the United States, except in the South Atlantic and Gulf states, and in winter may be seen in every state of the Union except Florida. These birds are about seven and one-half inches long. Their plumage is dull chocolate-brown above, and their distinguishing marks are a black patch on the breast and small hornlike tufts of dark feathers above and behind the eyes. In the breeding season the males soar high in the air, like the skylark, pouring forth their melodious song while on the wing. They feed on weed seeds, waste grain and various insect pests, including the May beetle, cloverleaf weevil, potato-stalk borer, nut weevil and chinch bug, and are therefore valued aids to the farmer. Grasshoppers and cutworms are also a favorite food. E.T.S.

LARK'SPUR, a summer-flowering herb of the buttercup family, which is found in the cool regions of both hemispheres. It receives its name from the odd formation of the flower parts, the upper sepal having a long, curved

spur, and the other five being grown together. The petals, too, are irregular in form. About 100 species have been described, many of which have been cultivated as ornamental plants. The flowers are blue, white or pink. One species grows in great profusion in California. Some species are considered poisonous, cattle and horses being most susceptible, and many cases of larkspur poison have been reported from the Western ranges. Sheep are practically immune. A species cultivated in Europe, containing several alkaloids, is used for medicinal purposes.

LARKSPUR

LARKSVILLE, PA., a borough in Luzerne County, in the northwestern section of the state, situated three miles northwest of Wilkes-Barre and on the Susquehanna River. It is located in the heart of a rich anthracite-coal field and in the midst of beautiful mountain scenery. Larksville is distinctly a mining town, having almost no industrial interests beyond coal mining. An interurban railway is in operation between this point and adjacent cities and towns. In 1910 the population was 9,288. The area of the borough is nearly five square miles.

LARVA, *lahr'va.* In the life history of many small creatures, the first form of life which appears from the egg is vastly different from the parent. In that early stage it is called a larva, which is a Latin word meaning *ghost, specter* or *mask.* The plural form of the word is *larvae.* The term is used in the sense that the creature in that stage hides, or masks, the real character of the finally perfect individual. It was first applied to insects only, but now also covers the early form of any animal in which there is little resemblance to the parent. For example, the *tadpole* is the larva of the frog. The larva of a moth or a butterfly is called a *caterpillar;* that of a fly is called a *maggot;* that of a beetle is known as a *grub.*

LARVAE

(*a*) Butterfly; (*b*) beetle; (*c*) mosquito; (*d*) frog.

The principal duty of a larva is to eat and grow, and in so doing considerable harm is done to vegetation by certain species. At different points in their development larvae outgrow their skins and shed them. Finally some enter what is known as the *pupa,* or the *chrysalis,* stage, from which they at last emerge in their true forms.

Related Subjects. The reader is referred to the following articles in these volumes:

Butterfly	Frog
Caterpillar	Insect
Chrysalis	Metamorphosis

LARYNGITIS, *lar in ji' tis.* This term, like all medical terms ending in *itis,* signifies an *inflammation*—in this case, of the voice box, or larynx. Laryngitis is always accompanied by by more or less hoarseness and cough, the latter caused by tickling or irritation. The hoarseness may continue for a short time only, as in public speakers who use the voice much, and often incorrectly, or it may be persistent or chronic hoarseness, which exists in consumption and syphilis of the larynx. Between these two are all grades of severity, and the causes are many and varied.

The healthy throat may be overworked and ready to become inflamed by a cold; the voice may be overtaxed, as in public speaking; the throat may be irritated by alcoholic beverages, tobacco, condiments, like pepper and vinegar, inhalation of dust, gas or vapor, as a necessary accompaniment of one's occupation. As a result of these conditions ulcerations are formed on the throat.

Whenever a condition of hoarseness persists over a week, the victim should at once consult a reliable physician. S.C.B.

LARYNX, *lar'ingks,* an organ of the body, boxlike in shape and composed of nine sections of cartilage. By it the voice is produced. It lies above the windpipe, between that tube and the hyoid bone. Of the cartilages which compose the larynx the most important are the *thyroid* and the *cricoid.* The former consists

of two winglike plates of cartilage which constitute the side walls of the larynx and meet in front to form the projection popularly known as Adam's apple. The cricoid cartilage is shaped like a signet ring, its broad side forming the back wall of the larynx. The voice is produced by means of the *true vocal cords*, two bands of elastic tissue controlled by small muscles and stretching between the upper front edges of the cricoid cartilage and the inner front wall of the thyroid. Between the true vocal cords is an opening known as the *glottis*, and above and lying parallel with them are other folds of membrane, the *false vocal cords*, so called because they have no share in voice production.

The sounds produced in talking or singing are the result of the vibration of the true vocal cords, this vibration being caused by the air rushing through the voice box. High, shrill notes are produced when the cords are tightly stretched, while deep, rumbling tones indicate a slackening of the elastic bands. An adult male has longer cords than an adult female, and this is true also of the glottis. The larynx of a boy who is approaching maturity undergoes rapid growth, a process which gives him a "cracking" voice. See VOICE J.H.K.

LA SALLE, *la sal'*, RENÉ ROBERT CAVELIER, Sieur de (1643-1687), next to Samuel Champlain, was the greatest of the French pioneers in America. He was born at Rouen, France, emigrated to Canada at the age of twenty-three and settled upon a tract of land eight miles above Montreal. In 1669 he sold his land and started on a tour of Western exploration in company with a party of missionaries bound for the upper Great Lakes. He soon left the party, however, and with a few followers proceeded southward. He is reported to have discovered the Ohio River and to have descended it as far as the rapids at Louisville, but his biographers are not agreed upon this point. Within the next two or three years La Salle traveled the length of Lake Michigan, crossed to its western shore and explored the valley of the Illinois River.

LA SALLE

In 1673, on recommendation of Count Frontenac, governor of Canada, he obtained from the French court a title of nobility and the grant of a large tract of land which included Fort Frontenac, on the site of the present city of Kingston, Ontario. Had La Salle remained there and engaged in the fur trade he might have become wealthy, but he was moved by a larger purpose. The rich country of the Illinois appealed to him, and he saw in it the site of a future empire, which in time might exceed the home country in wealth. It was his ambition to acquire and develop this vast territory for France. Accordingly, in 1677, he went to Paris and laid his plans before the court. He was received with honor, and many of his requests were granted, with the provision, however, that his plans be carried out without expense to the government.

La Salle's enterprise aroused the opposition and jealousy of the Canadian fur traders, because, should it succeed, it would deprive them of a part of their revenue. Notwithstanding this opposition, however, he proceeded to carry out his plans. He returned to Canada in 1678, and the following winter built, near Niagara, the *Griffin*, the first sailing vessel placed upon the Great Lakes. In the summer of 1679 the *Griffin* sailed to the Strait of Mackinaw, but it was lost on the return voyage.

During the next three years La Salle descended the Mississippi to its mouth, and there took possession of the entire Mississippi Valley for France, naming the region Louisiana, in honor of his king, Louis XIV. Much of what formed the Louisiana Purchase in 1803 was included in this region. In 1680 he built Fort Crevecoeur, on the Illinois River, above the present site of Peoria. This was the first rude settlement by white men within the present state of Illinois. Two years later Fort Saint Louis was built upon a bluff of the Illinois River, near the present village of Utica. Around this fort La Salle gathered and maintained for twenty years the largest confederation of Indian tribes ever controlled by a white man for so long a period. The bluff upon which the fort was built is now known as *Starved Rock* (which see), and is in the center of a state park.

Having established his fort and placed it in charge of his lieutenant, Tonty, La Salle again went to France to secure means and people for establishing a colony at the mouth of the Mississippi. In 1684 he sailed for the Gulf of Mexico. The expedition was embarked on four

vessels, and included a hundred soldiers, besides carpenters and colonists, with a good store of supplies. However, when the ships reached their destination, La Salle mistook Matagorda Bay for the mouth of the Mississippi, and the colonists were landed at that point. There was dissension between La Salle and the captain of the fleet, and the latter departed before the mistake was discovered. La Salle saw that his colony was doomed unless assistance could be procured, and with a few followers he heroically set out on foot for Canada, to obtain the necessary relief. On the way he was treacherously shot from ambush by one of his followers.

La Salle was a man of great vision and untiring energy, but he lacked the tact necessary to enable him to hold his followers loyal to his cause. During his entire career he faced opposition and obstacles which would have overwhelmed one of less energy. "It is easy," says Parkman, "to reckon up his defects, but it is not easy to hide from sight the Roman virtues that redeemed them. America owes him an enduring memory; for, in his masculine figure, she sees the pioneer who guided her to the possession of her richest heritage." His name is perpetuated in a county of Northern Illinois, and in a thriving city of that county, situated on the Illinois River, ninety-nine miles southwest of Chicago. M.R.T.

Consult Abbott's *The Adventures of the Chevalier de La Salle and His Companions;* Thwaites' *France in America.*

LA SALLE, ILL., an important industrial city of Northern Illinois, with extensive coal-mining interests, situated in La Salle County about midway between the geographical center of the state and its northern border. It lies at the head of navigation of the Illinois River, and at the western terminus of the Illinois and Michigan Canal. Ottawa is fourteen miles east, Peoria is sixty-two miles southwest and Chicago is ninety-nine miles northeast. Railroad transportation is provided by the Chicago, Rock Island & Pacific, the Illinois Central and the Chicago, Burlington & Quincy; interurban electric railways connect with Chicago and intervening cities. La Salle was settled in 1830, was incorporated as a city in 1852 and named for René Robert Cavelier La Salle, the French explorer. Poles predominate in the large foreign element. The population increased from 11,536 in 1910 to 12,221 in 1916 (Federal estimate). The area of the city is three square miles.

The country surrounding La Salle is a rich bituminous coal region, and the city is the center of a large trade carried on by means of rail, river and canal. Coal mining is an important industry, but there are extensive manufactures of spelter, sheet zinc and sulphuric acid. One of the establishments employs 2,000 men, its annual output being nearly $7,000,000. Some of the largest Portland cement mills in the state are located here, and there are manufactories of clocks, brick, sheet-metal tools, machinery, plows and acid phosphate. Silica sand, fire clay and cement rock are found in the vicinity.

The notable buildings are a $100,000 Federal building, erected in 1916, a $200,000 hotel, built in 1915, and the township high school. In addition to the public and parochial schools the city has a business college and a Carnegie Library. Features of interest are a state mine-rescue station, the Illinois Central Railroad bridge and Hegeler Park. In the vicinity are Deer Park and Starved Rock. On the latter a band of besieged Indians died of starvation about 1774 (see STARVED ROCK). R.W.T.

LASSALLE, *la sal',* FERDINAND (1825-1864), a disciple of Karl Marx and the founder of the German Social Democrat party. As a political movement Socialism owes more to him than to any other man. He was born at Breslau, and studied at the universities of Breslau and Berlin. By 1848 he had become a radical Socialist, but although he wrote several pamphlets, he was never so influential through his writing as through his leadership. He first showed his ability as an organizer at the time of the democratic disturbances of 1848, and for his activity in that revolt he was imprisoned. From that time until 1861 he confined his activities chiefly to writing on philosophy and Socialism. In 1861 he organized the working classes into the first German labor union, and was again imprisoned for sedition. In the summer of the same year he was killed in a duel. See MARX, KARL.

LAS VEGAS, *lahs va'gas,* N. M., an important wool market of the Southwest, located in the northeastern part of the state, 132 miles northeast of Albuquerque and forty-eight miles east of Santa Fé. It is generally regarded as one city, but there are really two separate corporations. The older community, largely a Mexican town, is on the west bank of the Gallinas River. It is the county seat of San Miguel County, and contains the county courthouse. The modern city, known officially as

Vegas, is on the east side of the served by the Atchison, Topeka & ailroad. It is the seat of the New rmal University and of the New ane Asylum, and contains a Carry and various sanatoriums. The opulation of the town and city in 34.

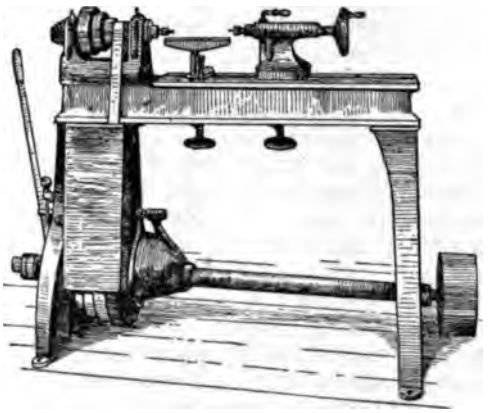
s is situated on a great plain about ove sea level and has an extremely imate. In the hills six miles north- city is Las Vegas Hot Springs, a and sanatorium in the vicinity of hot springs, whose waters vary 140° in temperature. Agriculture aising are the chief interests of this has railroad machine shops, a foun- achine shop, wool-cleaning mills, l wagon shops, flour mills and plan-

own of Las Vegas was settled under n Republic in 1835, and was incor- 1903. East Las Vegas was incor- 888 and chartered as a city in 1896.

AN, the cathedral church of the me, which ranks higher in dignity her Roman Catholic church in the s erected on the site of the palace Lateranus, which was confiscated eror Nero and later came into pos- Constantine the Great. He pre- the Catholic Church in 312, and urch structure was built on the lve years later, by Pope Sylvester as destroyed by an earthquake in e second and third churches were ban V made the fourth restoration l the edifice has since then under- l modifications.

urch the entrance of the Pope into lebrated with solemn effect. Five ncils, known as the famous Lateran ve been held here. The present lace, which was built about 1580, idence of the Popes until Avignon, made the temporary seat of the , but since the return to Rome they n the Vatican. The palace contains nt museums, which, together with were presented to the Papacy in e Italian government. Pope Leo many of his predecessors are buried ran.

layth, a machine for working wood bstances by rotating them before a t rest. They are used for cutting, polishing, filing, engraving and other like operations. The essential parts are the frame, or bed; the poppets, which support the object, and the rest for the tool. The space between the poppets can be adjusted to objects of varying lengths, and the left-hand poppet, con-



THE COMMON LATHE

nected with the source of power, forms the rotating head-stock. The tool rest is clamped to the bed between the two poppets. In the case of hand-operated machines, the tool is held in position by the turner; the larger machines are now driven by steam or electricity. Lathes for turning wood are operated at greater speed than those used for brass or iron.

LA'THROP, JULIA CLIFFORD (1858-), an American social worker who became nationally prominent in 1912, when President Taft appointed her chief of the Children's Bureau, a division of the Department of Labor. This was the first time that a woman had been placed in charge of a Federal bureau. Miss Lathrop was born in Rockford, Ill.; she studied at Rockford College, and in 1880 was graduated from Vassar College, of which she is one of the trustees. For many years after 1889 she was associated with Miss Jane Addams at Hull House, Chicago, where she gave much of her time to encouraging coöperation between citizens and official agencies for the re-

JULIA LATHROP
Head of the Children's Bureau of the United States.

lief of harmful social conditions. See HULL HOUSE.

She began her public work as a volunteer county visitor, under appointment of the Cook County agent to investigate needy cases in the neighborhood of Hull House. In 1893 she was appointed a member of the Illinois State Board of Charities, but resigned in 1901 as a protest against the prevailing political control of state institutions. She was, however, reappointed in 1905, and served until 1909. Miss Lathrop was largely instrumental in the establishment of the Illinois Society for Mental Hygiene, an organization of which she was the first president, and she has shown great interest in the improvement of hospital conditions for the insane. She visited Europe and investigated the methods used there for the care of the insane and of children; she assisted in establishing the Chicago Juvenile Court and the Chicago School of Civics and Philanthropy.

The Federal Children's Bureau, of which she has been head since 1912, has for its duty the investigation of matters affecting the welfare of all children. See CHILDREN'S BUREAU.

LAT'IMER, HUGH (1490-1555), an English reformer and martyr, one of the divines appointed by the University of Cambridge to investigate the legality of Henry VIII's marriage with Catharine of Aragon (which see). By declaring for the king he secured the favor of Henry VIII, who appointed him one of his chaplains. He became bishop of Worcester in 1535, and at the opening of Convocation preached two powerful sermons urging the necessity of reform in the Church. Not being willing to accept the Six Articles, which he thought favored Roman Catholicism, he resigned his bishopric in 1539, and lived in great privacy for six years. At the end of that period he was confined in the Tower.

On the accession of Edward VI Latimer was released, but when Mary came to the throne he and other reformers were arrested and imprisoned. He was confined in jail for more than a year, feeble, sick and worn out by long-endured hardships, but his enemies would not wait for him to die. Summoned, with Ridley, before certain commissioners who were appointed to judge the two reformers, he was condemned to be burned at the stake. When brought to the place of execution opposite Balliol College, on the 16th of October, 1555, he exclaimed to his companion, "Be of good comfort, Master Ridley, and play the man; we shall this day light such a candle, by God's grace, in England, as I trust shall never be put out." See RIDLEY, NICHOLAS.

LATIN LANGUAGE, a language which belonged originally to the central Italian tribe of the Latins, but which became with the spread of Roman influence the dominant tongue of the ancient world. It belongs to the Indo-European family (see ARYAN), and was one of a group of related languages spoken in ancient Italy. When scholars first began to give attention to problems presented by philology, they assumed a close connection between Latin and Greek—closer than between other members of the Indo-European family; and in consequence argued that there must have been a single race from which both Greeks and Italians were descended. Closer study in recent years has shown, however, that no such close relationship exists, and that Latin is nearer to the Celtic than to any other tongue (see CELTS).

The Three Periods of Latin. The history of Latin as a living language divides itself into three periods: the *preliterary,* which extended from the earliest times to the beginning of Latin literature, about 240 B. C.; the *literary* period, from 240 B. C. to about A.D. 170, and the period of *decay.* In its earliest period, which is represented by inscriptions and a few manuscripts, Latin was a crude, undeveloped language, incapable of expressing the thoughts of a people in a high state of civilization. During the third and second centuries B. C. the change from a mere rustic dialect to a literary language took place, the poet Ennius having a great part in its development; and the so-called Golden Age (80 B. C.-A. D. 17) saw Latin brought to its highest point of perfection. Cicero and Caesar in prose, Vergil and Horace in poetry, showed what majestic effects might be achieved with this comparatively new medium. Throughout the later literary period, in the hands of writers whose chief striving was after ornament and overelaboration, Latin lost the simplicity which had been its chief charm in the works of the great authors mentioned above. Its vigor departed, and the decline was steady, until by the third century A. D. literary Latin could scarcely take rank as a living language.

From It Sprang Other Languages. Latin differed from most other languages in that it had no dialects, in the ordinary sense of the term. There was, however, developing side by side with literary Latin, a vernacular, or localized Latin, which differed in many respects

from the more formal speech. The distinction grew wider through the centuries, as the classical Latin declined and the speech of the common people became more vigorous, and by the fifth century the *Lingua Romana,* or language of Rome, as it was called, had entirely displaced the pure Latin. It was from this speech of the people that the Romance languages of Europe were derived—French, Italian, Spanish, Portuguese, Rumanian, etc. The Latin which was used throughout the Middle Ages in the schools and monasteries of Europe, as well as in official documents, was a deteriorated form of the early literary Latin. Modern English has many words which are derived directly from the Latin or indirectly, through the French or Italian. Modern scientific names, for instance, are almost all of Latin origin. A few examples of such derived words are given in the article philology.

Alphabet and Pronunciation. The Latin alphabet was derived from the Greek, which was brought to Italy by Greek colonists who settled in the southern part of the peninsula. In classical times the alphabet had twenty-three letters, the *j, u* and *w* of the English alphabet not being present. The letters did not in all cases have the same phonetic value as the Greek, and in some instances they differed in sound from their English derivatives. The "Roman method" of pronunciation which is used almost exclusively to-day in the schools is an attempt to approximate the original pronunciation of Latin, and differs from the "English method," which pronounces Latin words just as though they were English.

Like the Greek, Latin was an inflected language (see INFLECTION), though it was far from having as many verb forms as had Greek, especially in its early stages. In certain qualities, however, it ranked high, notably in concreteness and in precision of expression. The Romans, compared with the Greeks, were an unimaginative people, and it is natural that their language should have been better adapted to prose than to poetry, but in the hands of such a master as Vergil it was shown to be capable of a dignity and a sonorousness which have rarely, if ever, been equaled.

As a Study in Schools. Since the Renaissance there has never been a time when Latin has not been studied in the schools, and throughout the medieval and much of the modern period it was the chief study. A young man in his early college years was expected not only to translate fluently the great masters (that was really preparatory school work), but to write original Latin essays and poems. Of late years much opposition has grown up to the required study of this "dead language," and in many schools and colleges, especially in the United States, comparatively little stress is now laid on Latin. By time-honored rule, no college student in the past could earn his A. B. degree without Latin as a considerable part of his prescribed course of study. Since the introduction of the elective system, however, this requirement has been generally abandoned in the United States, although in most English and other foreign universities it is still maintained.

As the study of Latin is now arranged in most schools, the grammar of Latin is studied during the first of the time devoted to this language; Caesar, either four or eight books of the *Gallic Wars,* occupies the second year; Cicero's *Orations* the third year, and the poetry of Vergil the fourth year. The above covers the full high school course, with exercises in Latin composition, etc. College Latin includes a study of Livy, Horace, Terence, Plautus, Catullus, Tibullus and other writers.

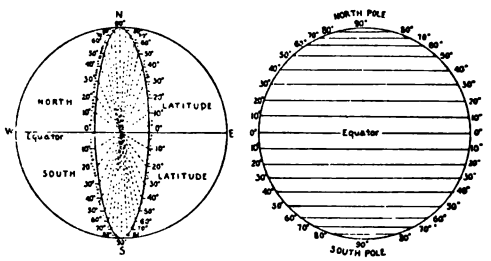
Two facts remain indisputable, however: first, that no language can ever be dead while it has a living literature of such worth as the Latin classical writings; second, that Latin, by reason of its orderliness and precision, affords in its study a mental discipline some developing minds might never acquire in any other way. The person who does not know Latin need not be deprived of the knowledge which the language offers in history and literature, for superior translations of every old Latin author are offered. What of charm is lost to the reader of translations that person never knows; he gets the facts, and in this practical day that seems to satisfy. A.MC C.

Excellent Latin textbooks, better than past generations possessed, may be had from many schoolbook publishers. Any good bookstore can furnish literal translations of CAESAR, CICERO, VERGIL and others.

LATIN MONETARY UNION. In 1865 France, Italy, Belgium and Switzerland united under this title in an association to regulate their coinage. For many years these countries had had a practically uniform system, and the coins of each country had circulated freely in the others. In 1864, however, France had reduced the value of its minor coins, and the result was confusion so far as international circulation was concerned.

By the treaty of 1865 the weight and fineness of the gold and silver coins were regulated, and it was provided that the gold coins and the silver five-franc pieces might be issued in unlimited quantities and should circulate freely, as before. The coinage of the smaller silver coins was limited. Ten years later the coinage of the silver five-franc piece was limited, and a gold standard was definitely adopted.

LAT'ITUDE, a term in geography used to designate the distance of any point on the earth north or south of the equator. Such distance is measured in degrees, the equator being 0° and each of the poles 90° from the equator; that is, the distance from the equator to a pole is one-fourth of a great circle drawn around the earth and passing through the poles. Places north of the equator are said to be in *north latitude;* those south of it are in *south latitude. Parallels of latitude* are imaginary



DIAGRAMS SHOWING LATITUDE

lines drawn around the globe parallel to the equator, the important ones being the *Arctic* and *Antarctic* circles and the tropics of *Cancer* and *Capricorn.* It is worthy of note that the highest civilization on the earth lies between 25° and 60° north latitude, and that the earth's greatest cities in the northern hemisphere are quite close to the 40th parallel of north latitude.

A degree of latitude at the equator is equal to about sixty-eight and seven-tenths common miles; at latitude 40° a degree is nearly equal to sixty-nine miles. The length of "the middle degree," that is, at places in latitude 45°, is 364,606 feet, a little over sixty-nine miles. The distance in degrees east or west of any north and south line is called *longitude* (which see).

Related Subjects. The reader is referred in this connection to the following articles in these volumes:

Antarctic Circle	Longitude
Arctic Circle	Pole
Degree	Tropics
Equator	Zone
Geography	

LATIUM, *la'shi um,* in ancient geography, was that part of Central Italy along the coast of the Mediterranean Sea, southeast of Etruria and northwest of Campania. Its chief cities formed a league which warred with the Romans from 340 to 338 B. C., after which it was incorporated with Rome. Its location nearly coincides with the modern Campagna di Roma, which surrounds the city of Rome, but the ancient province was much more highly cultivated and more thickly peopled. Latium was occupied by the Latins, Hernicans, Volscians, Auruncans and the Aequi.

ANCIENT LATIUM

(1) Etruria
(2) Liguria
(3) Gallia Cisalpina
(4) Venetia
(5) Umbria
(6) Picenum
(7) Sabini
(8) Aequi
(9) Freutani
(10) Samnium
(11) Apulia
(12) Campania
(13) Lucania
(14) Peucetii
(15) Calabria
(16) Bruttii

LATROBE', PA., a manufacturing borough in Westmoreland County, situated in the southwestern part of the state, on Loyalhanna Creek. Pittsburgh is forty-one miles northwest. Transportation is provided by the Pennsylvania and the Ligonier Valley railroads, and electric lines operate to towns in the vicinity. Latrobe is located in a district rich in deposits of coal and iron. The people are engaged principally in coal mining, and in making paper, woolen goods and glass. There are also large coke ovens here. Noteworthy buildings are Latrobe Hospital, Saint Vincent's Monastery, Saint Xavier's Convent and the high school. In 1910 the population was 8,777; in 1916, by Federal estimate, it was 11,393.

LATTER DAY SAINTS, REORGANIZED CHURCH OF JESUS CHRIST OF, a religious sect with headquarters in Laomi, Iowa. It was organized in 1852 by Joseph Smith, son and namesake of Joseph Smith, founder of the Mormon Church. It accepts some of the doctrines of Mormonism, but holds that after the death of its founder the control of the Mormon body should have passed to his son; and it has always rejected the practice of polygamy. The Iowa group is known as "Reorganites" (the name "Josephites" is condemned by Mormon

authorities) by the Mormons proper, while they retort in kind by applying the name "Brighamites" to the Utah Church. The Reorganized Church has a membership of over 65,000 communicants, and 1,700 ministers. Its present head is Frederick Smith, grandson of Joseph Smith. See MORMONS. M.M.B.

LA TUQUE, *lah took',* a town in Champlain County, Quebec, on the right bank of the Saint Maurice River, at its confluence with the Bostonnais River. La Tuque is about eighty-five miles directly northwest of the city of Quebec; by rail the distance is 118 miles via the Canadian Northern and 130 miles via the Transcontinental Railway. La Tuque is the terminus of a branch of the former and is on the main line of the latter. The town is in a lumbering region, and is known for its large saw and pulp mills. The town hall and the Roman Catholic convent and college are worthy of mention. Population in 1911, 2,934; in 1916, about 3,200.

LAUD, *lawd,* WILLIAM (1573-1645), an English prelate who is remembered chiefly for his severity against the Puritans during the reign of Charles I. Shortly after his ordination to the priesthood, in 1601, he openly displayed his contempt for Puritanism, and when, after rising steadily through several high Church positions, he was made Archbishop of Canterbury (1633) by Charles I, he coöperated with the king in every possible way to force the Puritan dissenters to conform to the established forms of worship. Proceeding against them by means of fines, imprisonment and exile, he won the bitter hatred not only of the people as a whole, but of Parliament. His course of tyranny was finally checked when he attempted to force upon the Scotch the forms of worship prescribed by the English Church. In 1641 he was arrested and sent to the Tower, and two years later was condemned to death by Parliament on a charge of treason and other crimes. In January, 1645, he was beheaded.

LAUDANUM, *law'da num,* a powerful and dangerous fluid preparation, containing forty-eight grains of opium to the ounce. The name is derived from the Greek *ledanon,* meaning *resinous juice* or *gum of a certain shrub.* It is prepared by softening powdered opium in alcohol and straining off the liquid portion. In color it is a dark brownish-red, and the odor is that of opium. It is all too frequently administered as a domestic remedy for pain or sleeplessness by those ignorant of its power. Extreme caution should be taken in giving it to infants for its soothing effects, as very small doses have been known to prove fatal. A person who has taken an overdose of laudanum should be given an emetic, or the drug should be expelled with a stomach pump. Artificial respiration is often resorted to in desperate cases. Walking people about and giving them strong coffee as a stimulant are other helpful remedies. At the present time morphine and codeine are frequently used as substitutes for laudanum. For restrictions regarding distribution of drugs derived from opium, in the United States and Canada, see OPIUM. W.A.E.

LAUGHING GAS. See NITROUS OXIDE.

LAUGH'LIN, JAMES LAURENCE (1850-), an American economist, born at Deerfield, Ohio. He was educated at Harvard and the University of Geissen, Germany, and from 1878 to 1887 was connected with the department of political economy at Harvard University. In the latter year he became president of the Manufacturers Mutual Fire Insurance Company at Philadelphia. In 1890, however, he returned to university work as professor of political economy at Cornell and two years later entered upon his most important work as head of the department of political economy at the University of Chicago. He is one of the most accurate economic investigators in America and has done valuable work in applying the principles of his subject to modern conditions and needs. In 1894 he prepared the plan for the present financial system of San Domingo, served as a member of the Monetary Commission appointed by the National Monetary Convention in 1897 and as a member of the Pan-American Scientific Congress in 1909. In 1913 he was frequently consulted by the framers of the Federal Reserve Bank Act, and his advice was followed in many provisions of the finished bill. He has made a special study of finance, and has written such valuable books on the subject as *The History of Bimetallism in the United States, Prices Since 1873, Facts about Money* and *The Principles of Money.* Other important works are *The Elements of Political Economy,* a textbook, and *Industrial America.*

LAUNDRY, *lawn'dri,* a room or building where clothes are washed and ironed, or an establishment where such work is carried on as a business. This article deals only with the steam laundry, an establishment of rather recent origin which has become industrially important in all civilized countries.

In this type of laundry, steam is used in running the machinery and heating the water, and sometimes ironing devices are also heated by steam. The quality of the water employed is of considerable importance. If only hard water be obtainable, then the water must be artificially softened. In the best modern laundries clothes first go through a disinfecting process, during which they are bathed in steam at high pressure. They are then placed in washing machines, which may be either revolving or stationary. In the first kind the clothes are cleaned by being agitated by revolving cylinders, while in the stationary machines they are beaten by plungers. They may be boiled in the same machine.

After the clothes are thoroughly cleansed, they are passed through a wringer and sent to artificially heated drying-rooms, through which air is kept circulating by fans. The ironing machine consists of some form of hard, polished metal surface, heated by steam or electricity, which presses the clothes against another smooth surface, usually covered with a felt padding and a cotton sheet. Many varieties of ironing devices are in use.

There are over 5,000 steam laundries operating in the United States, representing an investment of about $69,000,000. The receipts for a single year are about $105,000,000. The six cities doing the largest amount of business are, in order, Chicago, New York, Philadelphia, San Francisco, Los Angeles and Saint Louis. The Dominion government presents no statistics for the industry in Canada.

LAUREATE, *law're ate.* See POET LAUREATE.

LAUREL, *law'rel,* a family of trees and shrubs remarkable for their aromatic properties, including such well-known medicinal plants as the sassafras, benzoin and camphor trees. The name is probably most familiarly associated with the *bay,* or *sweet* laurel, whose graceful evergreen leaves formed the wreaths which crowned the victors in the ancient games (see BAY TREE). The name is also applied to plants of other families, notably the *cherry* laurel and the *Portugal* laurel, both of which belong to the rose family, and to the beautiful *mountain* laurel, a member of the heath family. The latter is described in the article KALMIA.

The Laurel in Legend. In classic mythology the laurel tree was sacred to Apollo, the sun god. According to the legend, he loved and wooed the beautiful nymph Daphne, daughter of the river god Peneus. Delighting only in woodland sports and in the spoils of the chase, Daphne sought to elude her handsome lover. Though she fled swifter than the wind she saw that she could not escape, and so called to her

THE LAUREL
The laurel branch, and the crown of laurel, "meed of mightie conquerours and poets sage."

father for help. Thereupon he changed her into a laurel tree, ever afterwards sacred to the sun god.

LAUREL, MISS., the county seat of Jones County, and a center of the lumber industry. It is situated in the southeastern part of the state, on the Tallahoma and Tallhala creeks, twenty-nine miles northeast of Hattiesburg, ninety miles southeast of Jackson and 139 miles northeast of New Orleans. Transportation is provided by the New Orleans & North Eastern, the New Orleans, Mobile & Chicago and the Gulf & Ship Island railways. Laurel is a city of rapid growth, as it had only 100 inhabitants soon after its settlement in 1894. It was incorporated as a city in 1900. In 1910 the population was 8,465; it had increased to 11,779 in 1916 (Federal estimate). The commission form of government, with three elective officers, was adopted in 1913. The area of the city is four square miles.

Laurel is located in a district which produces yellow pine in such abundance that many of its handsome residences are built of it, and some of its streets are made of creosoted yellow pine. The city owes its existence to the establishment of extensive sawmills, which have sufficient timber available to last for many years. In addition to the lumber mills, there are cotton mills with 10,000 spindles, employing 400 people, a brick and tile plant with a daily output of 30,000 bricks, a large fertilizer establishment, a knitting mill and a cotton compress. Notable buildings are the city hall, the Y. M. C. A. building and the Eastman Gardiner office building, erected in 1914 at a cost of $150,000.

85,000 post office was in course of erection
)16. In the vicinity is the state agricul-
farm.

.URENS, *law'renz,* HENRY (1724-1792),
ımerican statesman of the Revolutionary
d. He was born at Charleston, S. C., and
became a conspicuous figure in the pa-
.c group which opposed British aggression,
ç one of thirty-eight Americans who signed
tition to dissuade Parliament from pass-
:he Boston Port Bill (1774). In 1775 he
me a member of the First Provincial Con-
and was elected president of the Conti-
ıl Congress in 1777. Laurens was sent to
ınd in 1779 to negotiate a commercial
y, but was captured at sea by the British
imprisoned in London Tower for fifteen
ths. Twice he refused offers of pardon,
:ach time it was made a condition that
erve the British ministers. In 1782, with
ns, Jay and Franklin, he signed the pre-
ıary articles of peace between the United
:s and Great Britain (1782), but failing
:h prevented his remaining in Paris for the
tiation of the final treaty.

ıURENTIAN, *law ren'shi an,* **PLATEAU, AURENTIAN SHIELD,** a vast region in
h America, comprising more than one-
of the total area of Canada. It is shaped
hly like a shield surrounding Hudson Bay
he east, south and west, and forming a
: part of the great islands to the north.
:he east it forms the Labrador peninsula.
:he south it extends through the province
'ntario as far as Lake Superior and Geor-
Bay. West of Hudson Bay the shield
ıds to the northwest, its western edge be-
ıot far from and parallel to the Mackenzie
'r. The highlands of the part of the shield
; in Quebec north of the Saint Lawrence
r are frequently called the Laurentian
ntains, but of mountains in the usual sense
ıe word there are none.

:rface and Drainage. The physical features
ıe shield are nearly uniform throughout its
),000 square miles of area. Its average
ıtion is about 1,500 feet, but it is highest
rds the margin and dips gently down to
evel around Hudson Bay. Along the east-
border, on the coast of Labrador, are the
est levels, rising in the Nachvak Moun-
: to an altitude of 5,000 or 6,000 feet. The
.ce is hilly, or hummocky, for the harder
s, such as granite, stand out as rounded
ıs or narrow ridges. Viewed from the val-
)f the Saint Lawrence the effect is that of
210

mountains, but an observer stationed on one of the higher hills can see that the region was once a plain, for all the hills rise to about the same level and form a uniform skyline.

The most characteristic feature of the region is the innumerable lakes, of all sizes, with which it is covered. These lakes and the winding rivers flowing in all directions form so nearly continuous a series of waterways that it is possible, by making occasional portages, to travel in any direction in a canoe. The winding courses of the rivers, flowing from almost every lake, are due largely to the presence of soft rocks in company with granite and other hard rocks. The larger lake basins have been formed partly by the removal of the softer rocks, but mainly by the damming of valleys through glacial deposits. The rivers generally have no regular channels, but spill over from one basin into the next, though a few of them cross the edge of the shield and flow in very deep, high-walled valleys cut in solid rock. The most famous of these, the Saguenay and Hamilton rivers, flow between walls 1,500 to 1,800 feet high, and end in long valleys floored by the sea. They are good examples of fiords, comparable to those of Norway.

The watershed between the Hudson Bay rivers on the one side and the Great Lakes-Saint Lawrence system and the Mackenzie system on the other is very irregular and often low and marshy without any continuous range of hills or mountains. There are lakes on the divide which send part of their waters to the Great Lakes and part to Hudson Bay.

Soil and Vegetation. On the ridges the soil is generally thin, but in the valleys it is often very rich and productive. The southern part of the Laurentian region includes immense stretches of forest land, which are, with the possible exception of British Columbia's forests, the Dominion's chief source for timber. In the far north, on both sides of Hudson Bay, are the *barren lands,* hills and valleys on which grow only grasses, mosses and lichens. Gold, silver, nickel, copper and iron are mined in various sections, and fur-bearing animals are common nearly everywhere.

Oldest Part of North America. When the wrinkling of the earth's crust first caused the land to rise above the water, the first part of North America to appear was the Laurentian shield. This was followed by the Appalachian system, and later by the Rocky Mountains system. Between these three mountain masses

lay a great stretch of shallow water. The Laurentian shield was originally much higher than it is to-day, but heat and cold, rain and snow and the great glaciers which once covered the region all had effect, and the highlands were gradually worn down. The Laurentian shield thus supplied the greater part of the material which formed the great central plains of the continent. A.P.C.

For further details, consult CANADA, subtitle *Physical Characteristics of the Dominion;* LABRADOR; QUEBEC.

LAURIER, *lo'ri a,* SIR WILFRID (1841-), a Canadian statesman, Premier of the Dominion from 1896 to 1911, the first French-Canadian to hold this office. His Premiership was not merely the longest, but in some respects

SIR WILFRID LAURIER

the most important, since Confederation. During those fifteen years Canada passed through a period of growth and development which left a nation scarcely recognizable as the Dominion of 1867. Conspicuous has been the expansion of Canadian railways, of agriculture and manufactures. More significant is the growth of Canadian nationality within the broad field of British imperialism, a greater national consciousness allied with a stronger feeling of kinship for all other parts of the British Empire. Of the many features of those fifteen years the outstanding ones are the enactment of special tariffs for goods imported from Great Britain, the participation of Canadian troops in the South African War, the contract for the construction of the Grand Trunk Pacific Railway, the adoption of two-cent postage for letters between Canada, Great Britain and the United States, the organization of the provinces of Alberta and Saskatchewan, and finally, the failure of the reciprocity agreement between the United States and the Dominion. This agreement, opposed by a majority of the Canadian people, ended the Laurier Ministry's lease of power.

Laurier was born at Saint Lin, Que., on November 20, 1841. Like all the children of the neighborhood the boy attended parish elementary school, but he had the added advantage of nine months' study in a Presbyterian school, where he learned to speak English. Association with English-speaking Presbyterians, moreover, seems to have had a permanent influence on his religious and racial views. At twelve he entered L'Assomption College, and at nineteen began to study law at McGill University. At graduation he was class valedictorian, an honor which he grasped to appeal for sympathy and understanding between the French and the English in Canada. This appeal was no less characteristic of him as Premier of the Dominion than as class valedictorian. When he had power, he did as he urged others to do many years before.

Early Political Career. For about six years after his call to the bar in 1864, Laurier divided his time between journalism and law. He edited a newspaper of extreme French sentiment, and at the same time associated with persons who were not in favor with the Roman Catholic Church. Like all the Quebec Liberals, Laurier opposed Confederation, because it would "prove the tomb of the French race and the ruin of Lower Canada." These fears were groundless, and a few years later Laurier himself was conspicuous in Dominion politics. After three years in the Quebec assembly, he entered the House of Commons in 1874, and in 1877 became Minister of Inland Revenue in the Mackenzie Cabinet.

In 1878 began the long period of Liberal opposition, which ended in 1896 with the elevation of Laurier to the Premiership. During the first half of the intervening eighteen years Laurier was Edward Blake's first lieutenant, and during the latter half he was the acknowledged leader of the Liberals. In 1887, when Laurier succeeded Blake, the memory of Riel's execution and the militant nationalism of the French-Canadians, added to Laurier's race and religion, made his task doubly difficult, yet from the first he won the favor of the English-speaking Liberals. The Liberals lost the gen-

eral elections of 1891, but in 1896 were triumphantly returned.

The First French-Canadian Premier. One of the chief issues of the campaign related to the Manitoba separate schools. Although himself a Catholic, Laurier opposed the Dominion bill which was intended to force the Manitoba government to restore the Roman Catholic separate schools. On this issue, and on the plank of moderate tariff revision, the Liberals won a sweeping victory. The principal events of the next fifteen years are referred to elsewhere (see CANADA, subtitle *History of Canada*) and have also been mentioned above. The settlement and exploitation of the Canadian Northwest is likely to be considered, a century hence, as the greatest achievement of this period. In 1910 Sir Wilfrid arranged a reciprocity treaty with the United States, but when the issue was submitted to the voters at the general elections of 1911, the verdict was against reciprocity. The Laurier Ministry resigned on October 6, 1911, and Sir Wilfrid again became leader of the opposition. On the outbreak of the War of the Nations he ably seconded Sir Robert Borden's appeals for loyalty and service to the Empire, and although still in opposition he declined in any way to embarrass the government in its war policies. This exhibition of restraint, though it could not add to the regard which Canadians have for Laurier as a man, was evidence to the world of a new Canadian nationalism, in which party interests and self-seeking were lost to view.

Sir Wilfrid bears a striking facial resemblance both to Sir John A. Macdonald and to Benjamin Disraeli, Earl of Beaconsfield. Public interest in this fact was noteworthy during his first visit to England in 1897, on the occasion of Queen Victoria's Diamond Jubilee. Laurier is a speaker of genuine eloquence, without doubt one of the greatest of Canadian orators. He is not merely a skilful party leader, but a statesman of vision, who keeps the respect of his opponents as well as the loyalty of his followers. On the many occasions when he has represented the Dominion—at the Imperial Conferences in London in 1907 and 1911, at the sessions of the Joint High Commission at Washington in 1898 and 1899, at every conference in which he has taken part—his presence has insured a dignity and integrity which is as characteristic of him in private affairs as it is in public life. W.F.Z.

Consult Willison's *Sir Wilfrid Laurier and the Liberal Party*.

LAURIUM, *law'ri um,* MICH., is a village in Houghton County, in the Keweenaw Peninsula, the extreme northwestern part of the state. It is seventeen miles northeast of Houghton and seven miles from Lake Superior. Laurium and Red Jacket comprise the township of Calumet. The town is served by the Copper Range and the Mineral Range railroads. In 1910 the population was 8,537; in 1916 it was 10,356 (Federal estimate).

Laurium was incorporated as a village under its present name in 1895. It is in one of the richest copper-ore regions in the United States, in the vicinity of the Calumet and Hecla and other rich mines. Copper mining and associated industries are of chief importance.

LAUSANNE, *lo zahn',* the capital of the Swiss canton of Vaud, situated about one-half mile from Lake Geneva, from which a cable railroad runs to the central railway station and the upper city. The town is built on and around five hills, two of which are connected by a lofty viaduct. The beautiful Gothic cathedral, the finest ecclesiastical building in Switzerland, built in the thirteenth century, is an imposing landmark, and from the town there is a fine view of the lake and the mountains of Savoy and Valais. The opening of the Simplon tunnel in 1906 added greatly to transportation facilities and placed Lausanne on a commercial basis never before attained.

Close to the cathedral is a castle, built early in the fifteenth century, also the Palais de Rumine, containing an important local university and the cantonal library of 150,000 volumes. In recent years Lausanne has undergone modern improvements, and many of the older picturesque buildings have been destroyed or altered beyond recognition.

The city is visited by a great number of tourists and is well provided with hotels. It is as an educational center, however, that Lausanne is most famous, the splendidly conducted institutions attracting many foreign pupils. The population in 1910 was 63,926; the people are largely Protestants, and the French language is spoken.

LAUT, AGNES CHRISTINA (1872-), a Canadian journalist and author, best known for her biographical and historical sketches. Miss Laut was born at Stanley, Ont., but removed to Winnipeg during her childhood. She attended the University of Manitoba for three years, until ill health compelled her to withdraw. Ill health was not entirely a misfortune, for she spent the following summers

in the Rocky and Selkirk mountains, her knowledge of which was later of untold value to her. In 1895 she became an editorial writer on the *Manitoba Free Press,* at Winnipeg, and after 1897 was a frequent contributor to other Canadian and American newspapers and journals. Her first important book, *Lords of the North,* appeared in 1900, and was followed at irregular intervals by *Heralds of Empire; Pathfinders of the West; Vikings of the Pacific; The Conquest of the Great Northwest* and *Freebooters of the Wilderness.* One of her later books is entitled *Through Our Unknown Southwest, the Wonderland of the United States.*

eral minerals in solution in the molten matter. When lava cools these crystallize as they become solid, therefore rocks formed from lava are usually crystalline (see CRYSTALLINE ROCKS). If cooled rapidly lava forms a compact rock; if cooled slowly, it becomes a porous rock, brittle and easily crumbled. We usually associate lava beds with volcanoes, but in past geologic ages great quantities of lava were forced up between other layers of rock. In volcanic regions lava beds are found on the sides and at the base of the volcanoes. The regions around Mount Vesuvius in Italy, Mount Etna in Sicily, and the Hawaiian Islands contain lava beds of recent formation.

LAVA FORMATIONS

At left, grotesque shapes on a mountain side; at right, lava as it flowed through the streets of a mountain village, destroying everything in its path.

LAUZON, *lo zoN',* a town in Lévis County, Quebec, on the south bank of the Saint Lawrence River, two miles northeast of Lévis and about five miles east of the city of Quebec. It is on the Intercolonial and Quebec Central railways, and also has connection with Lévis by electric tramway. Lauzon's factories make window blinds, trunks and valises, boxes and aërated waters. There are two large dry docks, and shipbuilding and repairing is an important industry. The town was named for Jean de Lauzon (1582-1666), at one time president of the Hundred Associates, owner of the island of Montreal, and from 1651 to 1656 governor of New France. Population in 1911, 3,978; in 1916, about 4,200.

LAVA, *lah'va,* rock which flows or has flowed from volcanoes in a molten state. When cooled it forms rocks of different sorts, such as tufa, basalt and trachyte. Lava is not simply molten rock; it contains as well sev-

No lava flowed from Vesuvius, for instance, until the year 1066. See VOLCANO.

LAVAL, *la vahl',* UNIVERSITY (in French, UNIVERSITÉ LAVAL), a leading Canadian Roman Catholic institution for higher education. The university was founded in 1852 by the Seminary of Quebec, itself an institution established as a training school for priests by Bishop Laval in 1668. The seminary is still flourishing. The university received its charter, signed by Queen Victoria, in 1852, and was recognized by a Papal bull of Pope Pius IX in 1872. There are four faculties—theology, law, medicine and the arts. Under the terms of its charter, the Roman Catholic archbishop of Quebec is the Visitor and Chancellor of the University, and appoints professors in the faculty of theology. A university council, composed of the directors of the Seminary and the three senior professors of each faculty, nominates all other members of the faculty. The Superior of the Seminary is

ex officio rector of the University. The average enrolment of students is about 475, and the faculty numbers about seventy.

In 1876 it was decided to establish a branch of Laval University at Montreal. Of this branch the archbishop of Montreal is vice-chancellor. Since 1889 the university at Montreal has been practically independent in matters of administration and instruction, but degrees are awarded only by the university at Quebec. At Montreal there are about a thousand students.

François Xavier de Laval-Montmorency (1623-1708), for whom Laval University was named, was the first Roman Catholic bishop of Quebec. He was born at Laval, France, became a priest in 1653, and in 1659 was sent to Canada as Apostolic Vicar. He established the Seminary of Quebec in 1663, and in 1680 gave all his property to it. He was consecrated titular bishop of Quebec in 1674, but resigned in 1685, and thereafter gave most of his time to the direction of the Seminary. Laval was a man of conspicuous ability, and was for many years one of the greatest figures, if not the most powerful man, in Canada. Unfortunately, however, his zeal for the Church led him into frequent quarrels with the civil officials, notably Frontenac. He strongly opposed the sale of liquor to the Indians, a practice countenanced by many of the governors. His influence, especially before his resignation as bishop, was tremendous, and to a large degree determined the paternalistic character of French colonial government in Canada. W.F.R.

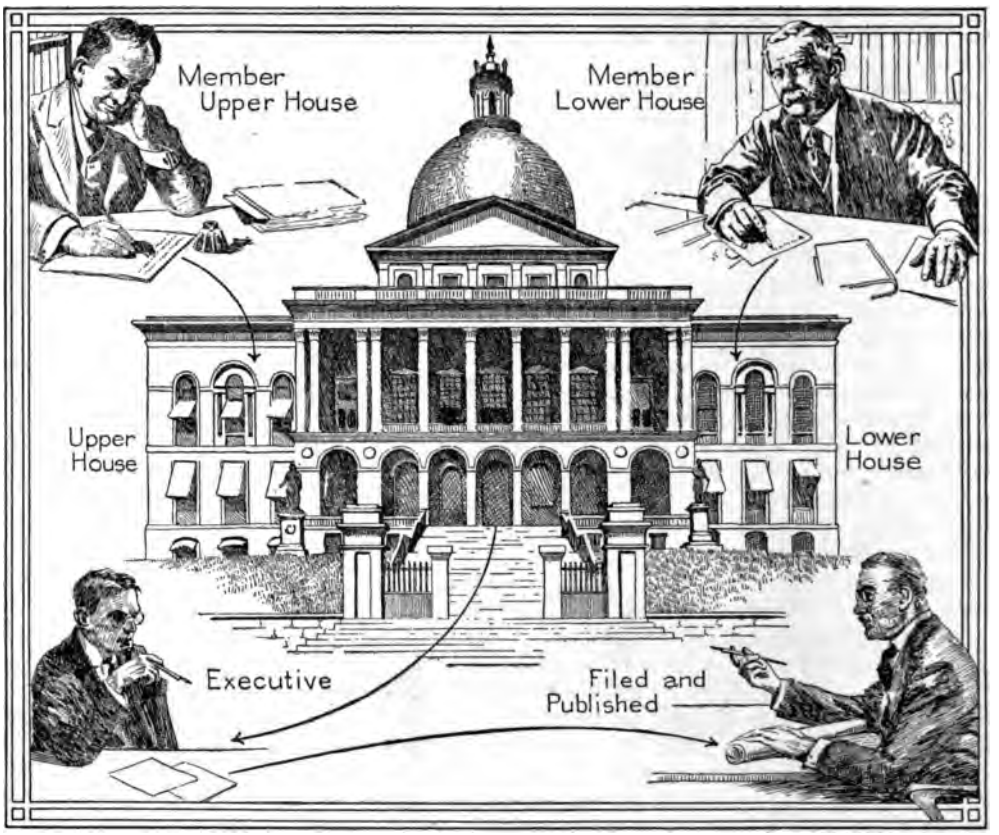
LAV'ENDER, a flower and shrub, about which is woven a halo of sentiment. For many years fine ladies and dear old-fashioned grandmothers have used it to scent their linens, and so the faint, sweet, musty odor has become quite generally associated with purity and fragrance. *Lavender and Old Lace,* a charming story told by Myrtle Reed, typifies the veneration in which lavender is held. The name comes from the Latin *lavare,* meaning *to wash,* and was given because of the ancient use of lavender in bath waters.

The little bush, from three to four feet high, grows wild in countries about the Mediterranean Sea. It is easily cultivated from cuttings or divisions of older roots, and thrives in all temperate climates, growing best in a sandy, well-drained soil. The gray-green leaves, which are fragrant like its flowers, are long and narrow. The little, pale-purplish blossoms, whose characteristic hue has added the word *lavender* to our vocabulary of colors, grow in whorls about a stalk. When properly dried, they retain their fragrance for a long time. From the leaves is obtained an oil which is used medicinally as a stimulant.

LAW, as related to government, is a system of rules designed to bring the conduct of the individual into harmony with the recognized practice of his fellow men. It is intended to give direction to individual actions that are regarded as essential to the welfare of the group.

In its origin, law is only custom. The individual acts or refrains from acting in a certain way. Precedent is thus established. With the setting up of tribunals, the process of law building is hastened. Judges find rules in interpreting popular customs and by consulting earlier decisions. Thus out of social habits there has gradually been evolved one of the three great branches of law—the *common law.* Early judges did not always find in custom a sufficient guide in reaching their decisions, so they began to apply the tests of common sense and their own notions of justice. In other words, they began to make laws for themselves, and this was the origin of the *law of equity.* In England, Canada and the United States, equity is recognized as judge-made law. The third branch of law, *statutory law,* is enacted by the legislature.

All law may be grouped under two heads, technically known as *substantive* and *adjective,* or remedial. The former serves to define the normal relations which the individual sustains to the state and his fellows; the latter deals with violations of the established order and punishes crimes. Substantive law, again, is divided into *public law,* which has to do with the state and its relations, and *private law,* which concerns private persons and property. Further subdivisions of substantive law are too numerous to be treated adequately in a general survey. It will suffice to say that substantive law deals with such matters as the relation of the citizen to the state, property rights, inheritance, the family, contracts, and so on. Constitutional law, which is a division of public law, regulates the organization of the state and the relation of its several parts. Administrative law concerns itself with the procedure of the several organs of government. International law, even in its most modern development, is almost wholly based on custom. No adequate machinery exists for coercing delinquent nations



HOW A BILL BECOMES A LAW

In either house of the English or Canadian Parliament or of the American Congress any member may introduce a bill which he seeks to have enacted into a law. He presents this bill in the house of which he is a member; it is referred to a committee, which discusses its merits and eventually may report it favorably for passage. If it passes the house in which it was introduced it goes to the other house, where it must be voted upon. In case it passes this second vote it then is sent to the executive authority, the President or Governor-General, for his approval. If he signs it, it becomes a law and is forwarded to the Secretary of State to be filed and published. If the bill fails to pass either house or if the executive will not sign it it cannot become a law unless passed over the veto.

Remedial law, or the law which applies remedies, concerns itself with the redress of wrongs, the punishment of criminals and the classification of crimes and penalties. In point of fact these two main branches of the law, the remedial and the substantive, overlap, since both have for their purpose the protection of society. It is impossible to give in detail here the treatment of laws by the various peoples. The chief divergences may be found in the articles upon the leading nations.

United States Law Schools. There are more than a hundred in the United States, teaching over 20,000 students every year. Most of them are connected with universities. The first school existed at Litchfield, Conn., from 1784 to 1833, and was founded after earlier attempts to establish legal lectures at colleges had failed. Several of the best university law schools, including those of Yale, Pennsylvania, Michigan and Northwestern universities, were established between 1830 and 1860. The *case system* of instruction, in which individual analysis of legal decisions supplants the study of textbooks, was established at Harvard in 1870 and is now employed by most of the leading schools. Pennsylvania and Harvard law schools admit only holders of college degrees, and several others require students to have completed from one to three years of college study.

Canada Law Schools. In Canada there is a faculty of law at each large university. Roman and civil law are given greater emphasis than in the United States. In both countries the course of study is usually three years, for which

the degree of Bachelor of Laws (LL.B.) is given. Laval University follows the French system, giving also the degree of Licentiate.

What Sort of Boy Should Study Law. In the days when education was a treasure possessed by comparatively few, almost every young man who could read or write was encouraged to enter the ministry or the profession of law. To-day this would seem absurd, yet those people make just as radical an error who believe that all boys who are good speakers should become lawyers, and all with a well-developed moral sense, ministers. The practice of law requires much more than the ability to speak in public. There is perhaps no occupation so trying on the morals and on integrity as the legal profession. Laws are attempts to introduce justice into the relationships of men; that they are constantly being changed is evidence that they are not perfect. Yet unless he watches himself very closely a lawyer will find himself testing proposed actions by the question, "Is it legal or illegal?" instead of "Is it right or wrong?" Thus even among men who consider themselves honest the law often becomes a cloak for moral dishonesty rather than a protection against illegality.

A successful lawyer must possess what is known as the legal mind; the ideal lawyer has the ability to see both sides of a case. It is obvious that at least one side in a dispute is wrong, and this is often true of both sides. Therefore many cases offered to lawyers are unjust or extravagant claims. A judicially-minded lawyer will anticipate the judge's decision in most of them, and advise his client to abandon or moderate his demands. He thus avoids losing his case in court and saves his client needless expense.

A boy should not decide upon a legal career because it is a "gentleman's profession" and because it appears to involve no hard work. There are no longer any "gentleman's professions." To-day every honest toiler may be a dignified member of his community; the most humble worker who is honest and clean is morally above the boy who feels that he must be a "gentleman." As to the law's ease, let it be recorded that small income, hardship and discouragement are more often the rule for the early years than in most other professions. The young man who turns to the law should be of a deeply-studious turn of mind, a clear thinker and a hard worker; and unless he wishes to take up a specialized form of practice he must be able to develop good speaking power—the fire that persuades juries. Added to the above, if he is fervent in his love of justice towards all men, he may feel that truly he is "called" to the bar. R.E.B.

Consult Holland's *Elements of Jurisprudence;* Markby's *Elements of Law;* Tourtoulon's *Philosophy in the Development of Law.*

Related Subjects. The following articles in these volumes treat of some of the various phases of law:

Accessory
Adoption
Affidavit
Age
Agent
Alias
Alibi
Anti-trust Laws
Appeal
Arrest
Assignment
Attachment
Attainder
Bail
Bankrupt
Barrister
Benefit of Clergy
Bertillon System
Bill of Attainder
Bill of Rights
"Blue Sky" Laws
Bona Fide
By-law
Capital Punishment
Chancery
Chattel
Civil Law
Claims, Court of
Code Napoleon
Commercial Law
Common Carrier
Common Law
Contempt
Contract
Convict Labor
Copyright
Courts
Crime
Criminology
Deed
Demurrer
Easement
Eminent Domain
Enemy
Equity
Estate
Evidence
Executor
Expectation
Ex Post Facto
Extradition
False Imprisonment
Finger Print Identification
Flotsam, Jetsam and Ligan
Franchise
Garnishment
Garrote
Guarantee
Guardian
Guillotine
Habeas Corpus
Hanging
Heir
High Seas
Homestead Laws
Husband and Wife
Impeachment
Imprisonment for Debt
Indeterminate Sentence
Indictment
Injunction
International Law
Intestacy
Judge
Judgment
Jury and Trial by Jury
Juvenile Court
Labor Legislation
Lease
Legacy
Libel
License
Lien
Limitations, Statute of
Lynch Law
Malice
Mandamus
Martial Law
Morals Court
Mortgage
Navigation Laws
Negligence
Neutrality
Notary Public
Nuisance
Oath
Parent and Child
Parliamentary Law
Patent
Peer
Perjury
Personal Liberty
Personal Property
Petition
Pillory
Power of Attorney
Preëmption
Primogeniture
Prison
Probate
Procedure
Proxy

Public Defenders	Title
Pure Food Laws	Torrens System
Quorum	Tort
Rack	Torture
Real Estate	Treadmill
Reform Schools	Treasure-trove
Replevin	Trespass
Retainer	Trustee
Riparian Rights	Usury
Search, Right of	Wager
Slander	Warrant
Statute	Wheel
Subpoena	Will
Sumptuary Laws	Witness
Supreme Court	Writ

The following jurists and lawyers are given separate treatment in these volumes:

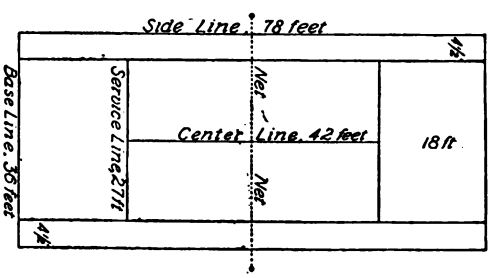
Alverstone, Lord	Hughes, Charles Evans
Blackstone, Sir William	Ingersoll, Robert Green
Brandeis, Louis	Jay, John
Chase, Salmon P.	Jeffreys, Lord
Choate, Joseph Hodges	Kent, James
Choate, Rufus	Lamar, Lucius Quintus Cincinnatus
Davis, David	
Duff, Lyman P.	Lindsey, Benjamin Barr
Falconbridge, Sir Wm. G.	Marshall, John
	Reading, Baron
Field, David Dudley	Story, Joseph
Field, Stephen Johnson	Taney, Roger Brooke
Fuller, Melville Weston	Waite, Morrison Remick
Gray, George	Wharton, Francis
Harlan, John Marshall	White, Edward Douglass
Holmes, Oliver Wendell, Jr.	Wilson, James

LAW, ANDREW BONAR (1858-), a British statesman, born in New Brunswick, Canada. When he was twelve years of age his parents removed to Glasgow, Scotland, and he completed his education in the Glasgow High School. At the age of sixteen he was given a position in the iron works of which his uncle was the head. He learned the business thoroughly and became a successful iron manufacturer. He was chosen chairman of the Glasgow Iron Trade Association and showed marked ability in the discharge of his duties. In 1900 he was elected to the House of Commons for Glasgow as a Unionist. In 1902 he became Parliamentary Secretary of the Board of Trade and held the position until 1906. In 1911 he succeeded Arthur J. Balfour as leader of the Opposition, and in the reorganized Cabinet of Mr. Asquith in 1915, he was given the portfolio of Secretary of State for the Colonies. Before David Lloyd George succeeded Asquith as Premier in 1917 Law was asked to assume that post, but he declined, and became an associate of Lloyd George as Chancellor of the Exchequer and one of the five members of the powerful War Council.

LAW, JOHN (1671-1729), a financier and speculator who became famous as the originator of a scheme to develop the resources of the province of Louisiana and the region bordering on the Mississippi, which was believed to be rich in precious metals (see MISSISSIPPI SCHEME). He was born at Edinburgh, the son of a goldsmith and banker. Law displayed a remarkable aptitude for mathematics and kindred sciences when he was very young. He spent a great deal of time in Amsterdam, studying the credit operations of the bank, and about the year 1700 returned to Edinburgh. At this time he proposed to the Scottish Parliament that a paper currency be adopted, but his proposition was rejected.

Having made a fortune by gambling, he opened a bank in Paris. The Duke of Orleans became his patron and in 1718 he adopted Law's plan for a national bank. In 1717 he had originated his famous Mississippi Scheme; three years later, on the failure of the project and the collapse of the bank, he fled from France. Settling finally in Venice, he managed to make a poor living by gambling. He died in May, 1729.

LAWN TENNIS, a modern adaptation of an old game called tennis (which see), played on a hard court of grass, gravel, cinders, clay or asphalt, with balls and rackets. The balls, 2½ inches in diameter, are of rubber, covered



PLAYING FIELD

with white felt; the rackets, which are 8x15 inches, have frames of ash or hickory, with cedar handles, the frames being netted with tightly-strung, varnished gut. The *court* is 78x27 feet, marked out by white tapes or lime boundaries, with an *alley* 4½ feet beyond on either side, used only when four people play. A *net,* three feet high, divides the court into halves. Each side is divided again 21 feet from the net, and the space between this line and the net is bisected into rectangles, called *receiving courts.*

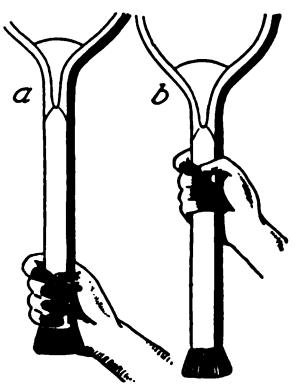
The object of the player who starts the game is to knock the ball with the racket into the opponent's court so he cannot return it.

This player, called the *server,* stands on the right side of the farther line. He serves the ball with an overhead stroke so that it flies into the receiving court diagonally opposite him. Two balls are allowed for the serve. If both are *faults,* that is, if both fail to land

RACKET AND BALL

in the receiving court, the server loses and the receiver gains a point. The first ball must not bounce, but other balls may be returned either on the first bounce or before touching the ground. When one side or the other misses a ball, service begins again from the opposite side of the line, and so on, alternately. At the end of the game the receiver becomes the server, and vice versa.

Each ball missed scores the opponent a point. The first point is 15, the second 30, the third 40, the fourth 50, or *game.* If each player has three points (40) the score is called *deuce,* and two successive points must be made to win the game. The first point after deuce is called *advantage* (*ad* or *'vantage,* for brevity); if each has four points the score returns to deuce. When one side wins all the points before the opposite side has scored any, the round is called a *love* game.



HOLDING THE RACKET
(*a*) Correct position of hand; (*b*) incorrect position.

Six games make a *set,* unless each player has won five games, when two games in succession must be won to complete the set. Three out of five sets must be won to decide a championship. J.H.B.

Consult Myers' *Complete Lawn Tennis Player;* Wright and Ditson's *Official Lawn Tennis Guide.*

LAW'RENCE, JAMES (1781-1813), an American naval officer, whose dying command, "Don't give up the ship," has become a watchword in the American navy, was born in Burlington, N. J. He was the son of a judge, and after attending the grammar school at home took up the study of law under his brother at Woodbury, N. J. Subsequently he took a course in the principles of navigation and naval tactics and joined the United States navy as midshipman in 1798.

He served on the *Ganges* in the West Indies and was made acting-lieutenant in 1800, receiving a lieutenant's commission in 1802. Lawrence distinguished himself in the war with Tripoli in 1804-1805, being one of the picked crew chosen by Captain Decatur to set fire to the *Philadelphia* (see BARBARY STATES). He served as lieutenant on the *Constitution* in 1808, and had under his command at different times the *Argus, Wasp* and *Vixen,* vessels noted in early American history.

In 1811 Lawrence was commissioned captain and assigned to the *Hornet,* joining the squadron under Commodore Bainbridge off the coast of Brazil (see BAINBRIDGE, WILLIAM). He captured the English ship *Resolution,* and, later, in an engagement with the English brig *Peacock* the latter surrendered, the Americans losing only one man killed and two wounded. Lawrence received for this exploit a vote of thanks from Congress and a gold medal.

He was then given command of the *Constitution,* but was shortly afterwards transferred to the *Chesapeake,* a vessel with an indifferently trained crew and an unlucky reputation. Just after assuming command, Lawrence was challenged by the English vessel *Shannon,* June 1, 1813. While fighting bravely against what proved defeat, he was desperately wounded, but insisted on remaining on deck for a time before being carried below. His words uttered at this time, when he knew the situation to be hopeless—"Don't give up the ship"—were engraved on the quarterdeck of the *Chesapeake,* and on a monument erected in Trinity churchyard, New York. He died June 6, at the age of thirty-two, in Halifax, the port to which the captured *Chesapeake* had been taken, and was buried in Halifax, but his body was later returned to the United States government. Lawrence was one of the twenty receiving nominations for class N in the Hall of Fame (which see).

LAWRENCE, KAN., the county seat of Douglas County, situated in the eastern part of the state, thirty miles east and south of Topeka, the state capital, and forty miles west and south of Kansas City. It is situated on both banks of the Kansas River and is on the

Atchison, Topeka & Santa Fe and the Union Pacific railroads. The population in 1910 was 12,374; it increased to 13,324 in 1916 (Federal estimate). The area of the city is four square miles.

Lawrence is the seat of the state university (see KANSAS, UNIVERSITY OF); it has also Haskell Institute, one of the largest of the United States government industrial schools for Indians. This school has an average enrolment of 700 students and is maintained at an annual expenditure of $240,000. Prominent public buildings include the Federal building, courthouse, Y. M. C. A. building, Carnegie Library, opera house, Masonic Temple and club buildings. Woodland, containing eighty acres, and Central and South parks are attractive recreation spots. Lawrence is surrounded by a rich farming section. There are extensive nursery interests, and the industrial establishments include a canning factory, which has 1,500 acres under cultivation, and manufactories of flour, iron, paper, collars, shirts, sashes and doors and pianos. Water power is obtained from the river.

Lawrence was settled in 1854 by the Emigrant Aid Society, an antislavery organization from Massachusetts, and was named in honor of Amos A. Lawrence, of Boston. Before 1864 it was the scene of a number of anti- and proslavery conflicts. The city adopted the commission form of government in 1914.

LAWRENCE, MASS., the county seat of Essex County, is one of the principal worsted-cloth manufacturing cities in the United States and contains what is said to be the largest single woolen mill in the world. It is in the northeastern part of the state, twenty-six miles northwest of Boston and ten miles northeast of Lowell, and is served by several branches of the Boston & Maine Railroad and by interurban lines to Andover, Boston, Lowell, Haverhill and Salem, Mass., and to Nashua and Salem, N. H. The population in 1910 was 85,892; in 1916 the Federal Census Bureau estimated the number to be 100,560; of these forty-five per cent are foreign born, German, English, Irish and Scotch predominating.

The city includes within its limits Arlington District, Carltonville and Hallsville, and occupies an area of six and a half square miles. It is built along both sides of the Merrimac River, which in 1916 was being deepened to make it navigable thirty miles distant to the sea. An immense granite dam, built in 1845-1847, below a fall of twenty-six feet in the course of a half mile, crosses the river, 900 feet wide at this place, and furnishes about 12,000 horse power for manufacturing purposes. Two canals, parallel with the river, the one along the north shore a mile in length, the other along the south shore one-half mile long, conduct water to the factories and mills. Several bridges cross the river in the city.

Parks and Buildings. The Commons, one of sixteen parks of much natural beauty, occupies seventeen acres in the heart of the city, and about it are grouped many of the important buildings. These include the courthouse, of fine architectural design, the Federal building and the old city hall, the original "town house."

Institutions. The city contains a large public library, the Essex County Training School, a children's home, Cottage and Lawrence hospitals, and the experimental station of the Massachusetts State Board of Health. Social, benevolent and charitable organizations are maintained by the various nationalities of the city.

Industries. Lawrence buys more raw wool than any other single market, and annually produces more than $60,000,000 worth of woolen goods; the largest worsted mill employs 9,600 operatives. The cloth-printing works of the city employ 10,600 people. Other important local industries include the manufacturing of book, news, cartridge and calendered papers; paper mill machinery and cotton goods.

History. In 1845 an organization of manufacturers, financiers and merchants secured the site of the present city with the purpose of creating an important industrial center. The settlement was organized as a separate town in 1847 and named in honor of two of the chief promoters of the project. It was chartered as a city in 1853. The filtration beds of the city waterworks system, owned by the municipality, were constructed in 1892 under the supervision of the State Board of Health, and are among the finest of their kind in the United States. The commission form of government was adopted in 1912. G.E.R.

LAWTON, HENRY WARE (1843-1899), an heroic American military leader, who, after serving in several wars, gave his life for his country in the Philippine Islands. He was born in Manhattan, Ohio. In 1861, on the outbreak of the War of Secession, he became a volunteer in the Union army, and at its close was mustered out a brevet colonel of volunteers. In 1866 he entered the regular army as second lieutenant, served with conspicuous

bravery against the Sioux and Ute Indians and captured the Indian chief, Geronimo (which see), in 1866. He commanded a division of volunteers in the Spanish-American War at Santiago, and fought with distinction in the attack on El Caney, July 1, 1898. He was then ordered to the Philippines as second in command to General Otis, and there rendered conspicuous service, fighting more than twenty battles. During the Battle of San Mateo, while riding on a white horse at the head of his troops, he fell, mortally wounded.

LAZ'ARUS, the brother of Mary and Martha of Bethany, the youngest member of the family that Jesus loved (*John* XI, 1-44). At Jesus' call, "Lazarus, come forth," he rose and came out of the tomb after having been dead four days. Tennyson, in *In Memoriam,* has this stanza concerning Lazarus of Bethany:

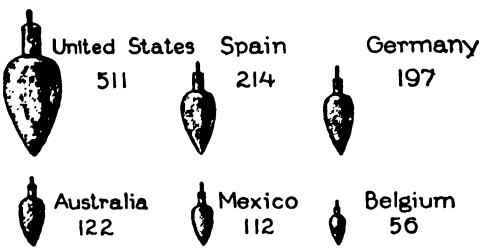
> Where wert thou, brother, those four days?
> There lives no echo of reply,
> Which, telling what it is to die,
> Had surely added praise to praise.

Lazarus is also the name of the beggar in the parable of the Rich Man and Lazarus (*Luke* XVI, 19-31). This is the only instance in which a proper name is given to a character in a gospel parable.

LEA'COCK, STEPHEN BUTLER (1869-), a Canadian educator and author, whose literary work has been done in two distinct fields. At first Professor Leacock was known as an economist and historian, but more recently he has reached a new and wider public as the writer of delightful, humorous sketches. Many of these sketches have appeared in periodicals and have later been collected and issued in volumes. Among these volumes are *Literary Lapses; Sunshine Sketches of a Little Town; Nonsense Novels; Behind the Beyond;* and *Arcadian Adventures with the Idle Rich.* Of his more serious literary efforts the best known are *Elements of Political Science,* and the biographies of Baldwin, Lafontaine and Hincks in the *Makers of Canada* series.

Professor Leacock was born in England, at Swanmoor, Hants, but went to Canada as a boy. He was educated at Upper Canada College and at the University of Toronto. He also took a postgraduate course in political science at the University of Chicago, from which he received the degree of Doctor of Philosophy. Since 1891 he has been a teacher, and for many years has been head of the department of economics and political science in McGill University.

LEAD, *led,* a soft metal, used principally in the manufacture of lead pipe and white lead. It is of a bluish-gray color and so soft that it can be scratched with the finger nail. Lead is eleven and one-third times heavier than water; from this we can readily understand how the expression "heavy as lead" originated. It is well to remember, however, that many substances are heavier than lead. When cut, lead presents a bright, metallic surface, almost as white as silver, but it soon turns dull because of the combination of oxygen of the air with it. It melts at a temperature of 620° F., a



Figures Represent Thousands of Short Tons

WORLD PRODUCTION OF LEAD

The six countries which lead in lead mining. The statistics apply to the year 1914, prior to the outbreak of the War of the Nations.

temperature above the melting point of tin but below that of zinc, but when it cools it contracts, so it cannot be used for making castings or anything requiring careful measurements.

Lead is found in many localities, in veins and also in masses. The process of mining is simple, since the ore is readily separated from the enclosing rock when broken into small fragments. Its chief source of supply is the ore *galena,* which is a compound of lead and sulphur. It occurs in cubelike crystals with a gray metallic luster. Another ore, a compound of lead and carbonic acid, contains silver and copper, and all three metals have to be considered in treating this ore (see METALLURGY). Lead is obtained from galena by roasting the ore with iron, when the sulphur combines with the iron and sets the lead free.

While its chief use is in the manufacture of lead pipes, it is also employed for lining tanks and tea chests and in making numerous alloys, such as solder, which is lead and tin; shot and type metal, composed of lead and antimony; and pewter, a combination of lead and zinc. A number of compounds of lead are important in the arts. *Lead acetate,* or *sugar of lead,* is used in dyeing; carbonate of lead, or *white lead* (which see), is the basis of the best

paints; *red lead,* a compound of lead and oxygen, is also used as a paint; *litharge,* another *oxide of lead,* is used in making plate glass and glass for lenses. Lead chromate is used as a pigment under the name of *chrome yellow.* It is of interest to note that although white lead and red lead are lead compounds, *black lead* is not lead at all, but a form of carbon (which see).

The United States produces more lead than any other country. The leading states, in the order of their production, are Missouri, Idaho, Utah and Colorado. Canada is rapidly developing a lead industry of importance, and, to

PRINCIPAL UNITED STATES SOURCES

encourage the operation of silver-lead smelters, the government pays a bounty of fifty cents per ton on all the lead produced. The annual output is about 20,000 short tons.

Lead Tree. If a rod of zinc is suspended in a solution of lead acetate, lead will precipitate on it in branching crystals, forming what is fancifully called a *lead tree.* J.F.S.

Consult Kemp's *Ore Deposits of the United States and Canada;* Hoffman's *Metallurgy of Lead.*

LEAD, *leed,* S. D., a city famous for its gold mines, which are among the largest in the world. It is situated in Lawrence County, about midway between the northern and southern borders of the state, and thirty miles east of the Wyoming state line. Pierre, the capital, is 250 miles east. The Chicago, Burlington & Quincy and the Chicago & North Western railways serve the city. Lead was settled in 1877; it was incorporated as a city in 1890, and it adopted the commission form of government in 1912. The word *Lead* is a miner's term, which denotes the discovery of a lode. About thirty-five per cent of the population is comprised of English, Italians, Austrians and Finns. Population, 8,392 in 1910; it had increased to 9,763 by 1916 (Federal estimate).

By the single industry of gold mining, Lead has been converted from a vast mining camp into a modern mining city, with well-lighted, well-paved streets and handsome buildings. Its setting is in the heart of the Black Hills, in the midst of some of the wildest scenery of the West. Such an abundance of pure sparkling water is furnished by the mountain streams that it is available for public and for private use. Here is located one mining company employing over 2,200 men; about 5,500 are employed by the other mining companies. The city has a Federal building, constructed in 1910 at a cost of $90,000; a high school in which domestic science, domestic art, business and technical courses are provided; the Hearst Free Library, the gift of Mrs. Phoebe Hearst; a business school, and a kindergarten. An institution worthy of mention is the Recreation building, which contains an auditorium, a gymnasium, a swimming pool, bowling alleys and billiard rooms; it was erected by one of the mining companies for its employees and cost a quarter of a million dollars. Besides the mining industry, the city has machine shops, mining-tool works and one of the most extensive cyanide plants in the world. E.C.T.

LEAD, SOUNDING, upon which sailors once depended for determining the depth of water, is a tapered leaden cylinder attached to a *lead-line* of rope or wire. Since shores and harbors have been charted, and instruments have been invented which will accurately measure depths from ships in motion, the lead is seldom employed in navigation, though still used in explorations of shallow waters (see SOUNDING). The underside of a lead is hollow and contains tallow, that it may bring up ooze or mud to prove that it has touched the sea bottom. The hand lead, for use in less than twenty fathoms (120 feet) of water, weighs from five to fourteen pounds.

LEAD POISONING, a serious disease caused by lead entering the system. It usually affects painters and persons employed in white-lead factories. The most common result is lead colic, or painter's colic. The trouble may also attack other persons who drink water which has passed through new lead pipes; from eating candy which has been colored with chromate, chloride or carbonate of lead; or by living in rooms which have been freshly painted with lead colors. Sometimes it results in kidney disease, muscular palsy, epilepsy or serious brain trouble. Lead poisoning is first detected by a change of color in the countenance of the sufferer, which turns to a sallow, earthy hue. The skin becomes dry and harsh; the digestion becomes disordered, and a sweetish, metallic taste is felt in the mouth. The margin of the gums turns blue or violet, due to the formation of a sulphite of lead.

LEAF INSECT, an East Indian insect, remarkable for its resemblance to a green leaf, and for this reason sometimes called *walking leaf*. It is bright green in color, and measures about three inches in length. Its foliagelike appearance is due both to the broad, ribbed wings and to the leaflike expansions at the joints of the legs. Even the eggs bear a curious similarity to the seeds of plants. Leaf insects are found under wood or shrubs, where on account of their form and color, they are not readily discovered. They feed upon leaves at night, and are usually quiet during the day. Other species found in Eastern countries and on the islands of the Indian Ocean are yellow or brown in color and look much like withered leaves. Certain wingless species resemble slender twigs.

LEAGUE, *leeg,* a measure of length of ancient origin. The Romans derived it from the Gauls and computed it as equivalent to 1,500 Roman paces, or 1.376 modern English miles. The league was introduced into England by the Normans, probably in 1066, and it then equaled two English miles of the period, or 2.9 modern English miles. At the present time it is a marine measure, equivalent to three geographical miles, or 3.456 statute miles. The same marine league is in use in other countries. Prior to the introduction of the metric system the French applied the term to two land measures, the legal posting-league, or 2.42 English miles, and the league of twenty-five to the degree, or 2.76 statute English miles.

LEAGUE TO ENFORCE PEACE, a society formed at a conference held in Philadelphia's Independence Hall, on June 17, 1915, the object of which is "to secure the maintenance of peace after the close of the war in Europe, by the use of economic and military force." The proposals of the League represent the efforts of a large body of public-spirited men and women to provide a satisfactory remedy for the conditions which made possible the deplorable European conflict. After a series of preliminary conferences the project was formally launched at the meeting in Philadelphia, where a number of articles setting forth the principles of the organization were presented and adopted. William Howard Taft was elected president, and Alton B. Parker vice-president; on the membership list of the League were names of hundreds of the foremost of America's citizens.

The underlying principle of the organization was stated by its president, Mr. Taft:

> The central basis of the plan which we respectfully recommend to the authorities who shall represent our government in any world conference that will necessarily follow the peace, is that the Great Powers of the world be invited to form a League of Peace, which shall embody in the covenant that binds its members the principle that every member of that League has a right to be consulted before war shall be perpetrated between any two members of the League; or to put it another way, that the whole League shall use its entire power to require any member of the League that wishes to fight any other member of the League, to submit the issue upon which that member desires to go to war to a machinery for its peaceful settlement before it does go to war.

The first annual assemblage, held in Washington, D. C., May 26-27, 1916, was attended by over 2,000 delegates, representing not only every state in the Union, but also Alaska, Hawaii and Porto Rico. In less than a year thereafter the United States entered the War of the Nations as a belligerent, on the side of the entente allies, and the League in part suspended its activities until the immediate results of the great struggle could be determined. Its officers expected the organization to be influential in framing the terms of peace.

LEAMINGTON, *lem'ing tun,* a town in Essex County, Ontario. It is situated on Lake Erie, and is the southernmost town in Canada. Windsor is thirty miles northwest. Railway transportation is provided by the Michigan Central and Pere Marquette railways, and an electric line extends to Windsor; steamers communicate with Pelee Island, on the south. Leamington is located in a district rich in agricultural products, especially in corn, tobacco, small fruits and vegetables. Large capital is invested in the tobacco industry in this locality, and the largest early vegetable hothouse in Ontario is located here. The leading manufactories make baskets, handles, cigars, foundry, machine shop and planing-mill products. Natural gas and oil are found in the vicinity. Leamington is an attractive town with fine, shady streets and handsome residences. Sea Cliff Park, a delightful outing place on the coast, is owned by the town. The population in 1911 was 2,652; it was estimated at 2,750 in 1916.

LEAN'DER. See HERO.

LEAP YEAR, a year which has 366 days, or one day more than an ordinary year. The extra day is added to the month of February. The origin of the name is unknown, but it probably arose from the fact that any date in a leap year after the added day of February

29 "leaps" over the day of the week on which it would fall in ordinary years. For example: if March 1 falls on Monday in one year it will fall on Tuesday in the next, if that is an ordinary year of 365 days, but on Wednesday if it is leap year. Leap years are those which may be exactly divided by four, except that years ending with two ciphers are leap years only when they are divisible by 400. See CALENDAR.

LEASE, *lease,* a contract or conveyance for the possession and profits of land or other property for a stated period. The party granting the lease is called the *lessor;* the party to whom it is granted is the *lessee,* or *tenant;* the fixed compensation received in return for the use, possession and profit of the property is called the *rent.* A lease for life terminates with the death of the lessee, while a lease for a term of years begins and ends at a certain specified date. Under a lease for a long period the tenant possesses greater privileges, as he becomes the virtual owner of the premises and is limited only by rules that govern the relations of landlord and tenant. Rents may be payable in valuables other than money, such as produce, but this is unusual; indeed, frequently the terms of a lease specify that the rental shall be payable in gold, to guard against possibility of having to accept a depreciated currency, which would lower the income derived from the property. The essential specifications in a written lease are dates, names, rent and description of property. A lease for a period of from one year or less may be by verbal contract, but it must be in writing if for a longer period. See CONTRACT; TENANT.

LEAST COMMON MULTIPLE, the least number that will contain two or more numbers without a remainder.

What number of pennies can be divided exactly into groups of two pennies each or groups

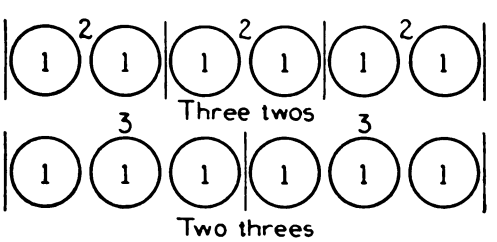


FIG. 1

of three pennies each? We can divide 6, 12, 18, 24 and so on into groups of 2's or groups of 3's, as three twos, two threes (see Fig. 1).

By a drawing show how 12 units and 18 units can be divided into groups.

What number of yards of ribbon can be divided exactly into 2-yard strips or 5-yard strips (see Fig. 2)? Into strips of 10 yards, 20 yards, 30 yards and so on?

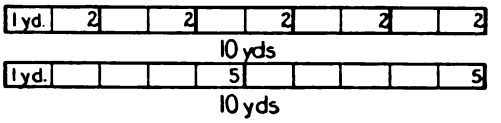


FIG. 2

Show the same for 20, 30 and 40, by drawings.

6, 12, 18, etc., are multiples of 3 and 2. 10, 20, 30, etc., are multiples of 2 and 5.

Because these numbers are multiples of two numbers, they are called *common multiples* of the two numbers. Since 6 is the smallest number that is a multiple of 2 and 3, and 10 is the smallest number that is a multiple of 2 and 5, 6 is called the *least common multiple* of 2 and 3, and 10 is called the *least common multiple* of 2 and 5. This term is abbreviated L. C. M.

How to Find a Least Common Multiple.

(a) The L. C. M. of several numbers often may be easily seen, as, of 2, 4, 8; 2, 5, 20; 5, 10, 30: 8 is the L. C. M. of 2, 4, 8; 20 is the L. C. M. of 2, 5, 20; 30 is the L. C. M. of 5, 10, 30.

(b) The L. C. M. is often readily found, as below, by seeing at once the greatest common factor of several numbers.

(1) Find the L. C. M. of 15 and 24.

$$15=5\times3$$
$$24=8\times3$$

The L. C. M.$=8\times5\times3$; that is, 8×15 or 5×24.

(2) Find the L. C. M. of 72 and 64.

$$72=9\times8$$
$$64=8\times8$$

The L. C. M.$=8\times9\times8$.

(3) Find the L. C. M. of 77 and 99.

$$77=7\times11$$
$$99=9\times11$$

The L. C. M.$=9\times7\times11$.

(4) Find the L. C. M. of 72 and 96.

$$72=3\times24$$
$$96=4\times24$$

The L. C. M.$=4\times3\times24$.

(c) The L. C. M. is found by factoring into prime factors.

(1) Find the L. C. M. of 78, 91, 104.

$$78=2\times3\times13$$
$$91=7\times13$$
$$104=2\times2\times2\times13$$

The L. C. M.=2×2×2×7×3×13.

Note that the "2" in 78 is not used in the L. C. M. because 2 occurs as a factor in 104, which is found in 2×2×2×13. The factor "7" of 91 must be used and "3" of 78 so that the multiple will contain 7×13 and 3×13. Look for the factors of 78 in the L. C. M. above. You find 2×3×13. Look for the factors of 91. You find 7×13. Look for the factors of 104. You find 2×2×2×13. Having found the L. C. M. of any set of numbers, always find in it the factors of each number.

(2) Find the L. C. M. of 300, 252 and 540.

$$300=2\times2\times3\times5\times5$$
$$252=2\times2\times3\times3\times7$$
$$540=2\times2\times3\times3\times3\times5$$

The L. C. M.=2×2×3×3×3×5×7×5.

Note that the first six factors are the factors of 540; the factor "7" is the only factor of 252 not in 540, and it must be used so that the L. C. M. will be divisible by 252; a second 5 is the only factor of 300 not in 540 or in 252, and it must be used so that the L. C. M. will be divisible by 300.

Every prime factor of each number must be found in the L. C. M., the greatest number of times it occurs in any of the numbers. Put into its usual form the rule is stated:

The L. C. M. of several numbers is the product of the different prime factors of the numbers, each factor being used the greatest number of times it occurs in any one of the numbers. This is seen in the last problem above: 3 is a factor of 540 three times; 2 is a factor of each of the numbers twice; 5 is a factor of 300 twice. Therefore 3 occurs as a factor in the L. C. M. three times, 2 occurs two times and 5 occurs two times.

This factoring is sometimes done as follows: Find the L. C. M. of 16, 54, 72.

2	16	54	72
2	8	27	36
2	4	27	18
3	2	27	9
3	2	9	3
	2	3	1

The L. C. M.=2×2×2×3×3×2×3×1.

Explanation. Find any prime factor common to two or more of the numbers; divide by this factor the numbers *divisible* by it, placing quotients in the line below, and with them the undivided numbers. Find a second prime factor, and divide and bring down as before. Continue as above until there is no factor common to any two of the resulting numbers. The L. C. M. is the product of all the divisors, quotients and undivided numbers. A.H.

LEATHER, *leth'er,* a commodity of the utmost service to mankind, made of the dressed skins of animals. Savage man used the pelts of wild beasts to protect him from the rigors of winter. Civilized man, for the most part, wears leather only on his hands and feet, but he has found many other invaluable commercial uses for it.

The untreated, dry skins of animals soon rot. Primitive man learned how to prevent this decay by treating hides with smoke, oils and the brains of the animals themselves, later resorting to certain astringent barks. The process of dressing is now much more scientific, skins being prepared for industrial use by tanning, tawing, chamoising, and so on. The hide of the animal consists of three layers, but it is of the true skin, the middle layer of gelatinous fibers, that leather is manufactured.

When the tanner gets his hides they are usually hard and inflexible. If they reach him from a distance, he finds they have been preserved by salting or drying, and are hard and stiff. To restore pliability, the hides are soaked in water, often being subjected also to a kneading process. The hair is then removed with the aid of milk of lime, or one of several acids. The skin is then ready for tanning. This is accomplished by placing it in a vat containing a solution made by soaking ground oak or hemlock bark in boiling water, the strength of the solution being gradually increased. The tanning of large hides requires from four to twelve months by this method, but for all common uses leather is now tanned less slowly by a chemical process. Sheepskins and goatskins are prepared by a process of *tawing,* bran and alum being substituted for tanbark. This produces the pliable leather used for gloves, the uppers of shoes, etc. The soles of shoes are made of the thick parts of horsehide or cowhide, found along the back of the animal. From goatskin various grades of kid and the so-called *Morocco,* used in bookbinding, are obtained.

The leather manufactured in the United States is the best in the world, and it is an important article of export. However, the best skins in the world are grown on sheep in the Caucasus Mountains region of Europe.

Artificial Leather, a term applied to substances which resemble leather and are substituted for it. Leather is a costly commodity, and since the demand for it is great the ingenuity of manufacturers put a substitute on the market in 1849. This was then called *leather cloth.* The process of manufacture is as follows: The cloth is covered with oily pigments, is dried in a hot oven, and after being passed between rollers, is covered with pumice dust.

The pumice dust serves to smooth the surface, which is then coated with enamel paint. Artificial leather is also made of parings of leather, reduced to a pulp, and then shaped in a mold. The commodity known as *vegetable leather* consists of rubber dissolved in naphtha and spread over linen cloth. It is especially stout and durable. A more modern substitute for genuine leather is called by the trade name *pantasote,* and few people are able to detect the real article from this clever and durable imitation. A great number of articles which are claimed to be leather-covered are really incased in imitation leather, and this substitution even extends to seat cushions for carriages and automobiles. G.B.D.

Consult Proctor's *The Making of Leather;* Leland's *Leather Work.*

LEATH'ERBACK, or **LEATHERBACK TURTLE,** also called *trunk-back,* is a sea turtle which is found in limited numbers throughout the tropics in the Atlantic, Pacific and Indian oceans. It is the largest turtle known, and is probably becoming extinct. The name *leatherback* is given to this species on account of the soft, leathery appearance of the brown shell. The animal sometimes wanders into the cooler regions, and is found occasionally on the American coast as far north as Cape Ann. The largest specimens grow to be six feet or more in length, and weigh from 800 to 1,200 pounds. The leatherback feeds on lobsters, crabs, shrimps, jellyfish and other marine prey. Its own flesh is not eaten by man, as it has a disagreeable flavor and is reputed to cause sickness.

Leatherbacks appear in large numbers on the Tortugas Islands off the coast of Florida during the breeding season. Sometimes more than 1,000 turtle eggs are found in one spot, where several females have deposited their eggs together. After they are hatched by the heat of the sun the little turtles seek the water.

LEAVENWORTH, *lev'en wurth,* KAN., the county seat of Leavenworth County, and an important commercial center, situated on the Missouri River on the northeastern border of the state, twenty-six miles northwest of Kansas City. Leavenworth is served by the Atchison, Topeka & Santa Fe, the Chicago, Burlington & Quincy, the Chicago Great Western, the Chicago, Rock Island & Pacific, the Leavenworth & Topeka, the Missouri Pacific and the Union Pacific railways; an electric line connects with Kansas City. The city was founded in 1854, and is the oldest permanent settlement in Kansas. Throughout the antislavery agitation it was an influential proslavery center. In 1855 it became a city and in 1909 the commission form of government was adopted. The population in 1910 was 19,363; the state census of 1915 reported 22,090.

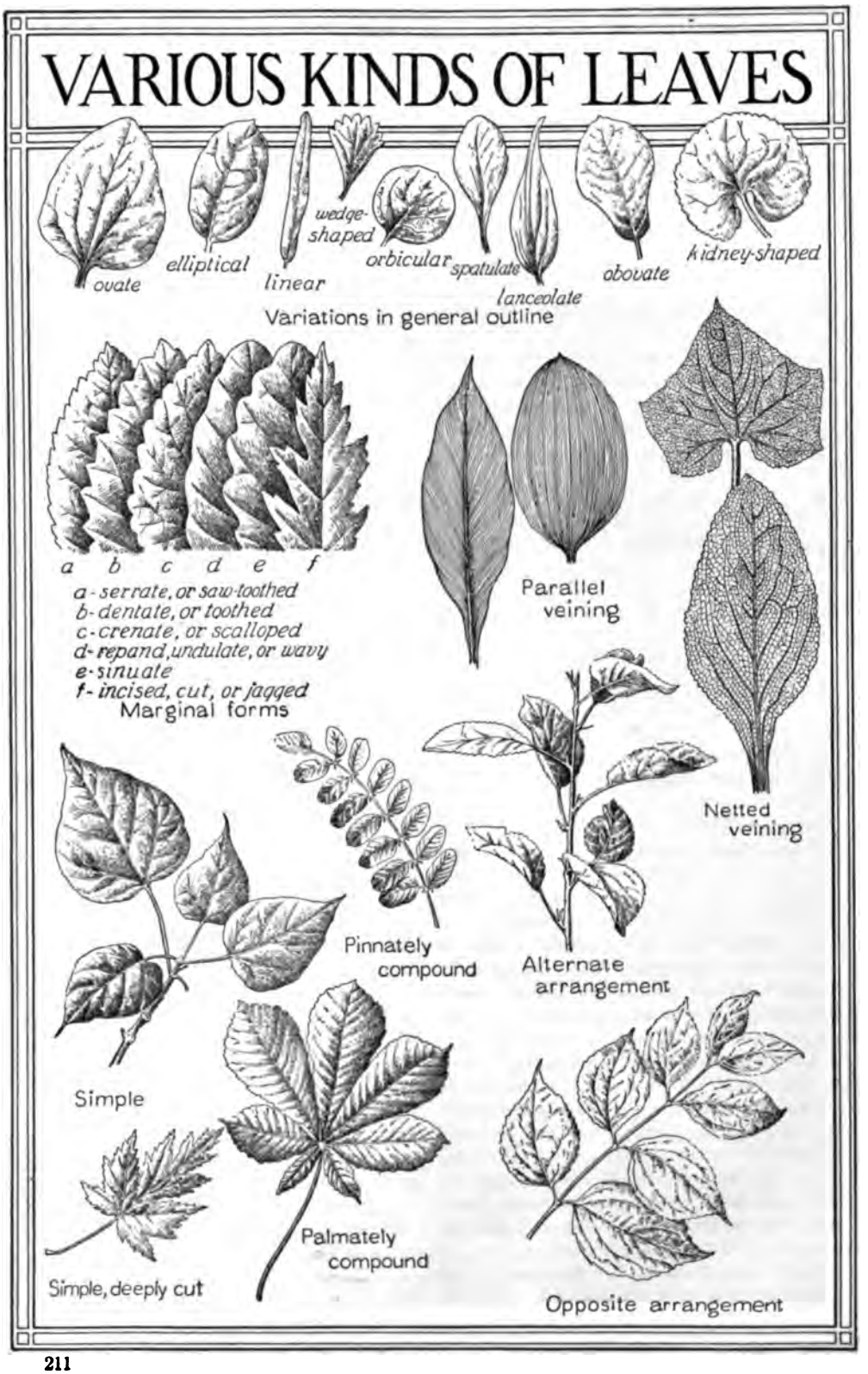
Besides being a distributing point of consequence, Leavenworth has large coal-mining interests; the city is built over almost inexhaustible coal deposits, and a large number of people are employed in the mines. Manufacturing is carried on extensively, the chief establishments being the woolen mills, flour and grist mills, iron foundries, lumber mills, machine shops, and furniture, broom and wagon factories. The most notable buildings are the Cathedral of the Immaculate Conception, Kansas State Orphan Asylum, the Federal building and county courthouse. Mount Saint Mary's Academy and the Whittier Library supplement the public schools.

The city received its name from Fort Leavenworth, north of the city, erected in 1827, and one of the most important military posts in the West. It has a noted infantry and cavalry school, a military prison and a national cemetery. An object of especial interest in the city is a mammoth bronze statue of General Ulysses S. Grant.

LEAVES, *leevz,* which clothe the trees in summer with garments of green, and array them in autumn with gorgeous reds and yellows, are among the most useful and important of plant organs. Not without a purpose did Nature fashion them in their bewildering variety and beauty; they were not created merely to be "the green sunshades over our heads," or the "thousand whispering tongues of the forest." The leaf is the builder of the plant; as John Ruskin has said in his *Modern Painters*—

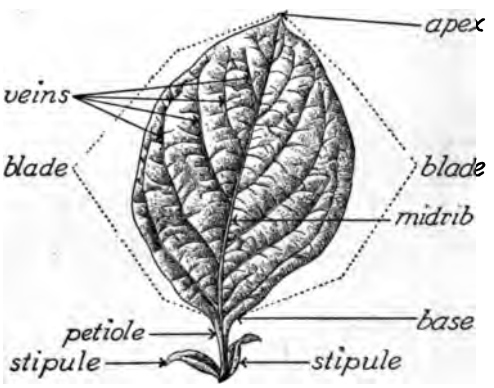
> It leads a life of endurance and effort; it connects itself with the whole previous edifice by one sustaining thread, continuing its appointed piece of work all the way from top to root.

How the Leaf Is Made. As will be shown, the leaf performs its work for the plant by using the sunlight, and it has been constructed so as to absorb as much as possible of that life-giving energy. The typical leaf, therefore, is a thin, flat outgrowth of the stem, expanded, in most cases, horizontally. Its upper and lower surfaces are covered with a thin, colorless membrane called the *epidermis,* or skin, and between these coverings are several layers of cells. The green color of the leaf is due to


VARIOUS KINDS OF LEAVES
ovate
elliptical
linear
wedge-shaped
orbicular
spatulate
lanceolate
obovate
kidney-shaped
Variations in general outline
a b c d e f
a - serrate, or saw-toothed
b - dentate, or toothed
c - crenate, or scalloped
d - repand, undulate, or wavy
e - sinuate
f - incised, cut, or jagged
Marginal forms
Parallel veining
Netted veining
Pinnately compound
Alternate arrangement
Simple
Palmately compound
Simple, deeply cut
Opposite arrangement

a substance called *chlorophyll,* or leaf green, found in certain of the inner cells (see CHLOROPHYLL). Running through the leaf are threads of fiber, forming *ribs* and *veins.* In the epidermis are numerous minute openings *(stomata),* known in popular language as *breathing pores,* because they influence the interchange of air between the outer and inner portions of the leaf. The chief parts of a perfect leaf are the expanded portion, or the *blade,* the leafstalk, called the *petiole,* and two expansions at the base of the petiole, known as *stipules.*

Forms of Leaves. Of all the countless leaves borne by plants year after year, no two are exactly alike, but botanists classify them according to certain prevailing types of formation. Every leaf may be placed in one of two



PARTS OF A LEAF

great divisions, *simple* and *compound,* but there are many varieties of both simple and compound leaves. To the former class belong those whose blades form one continuous piece; to the latter, those leaves which consist of several leaflets, each united to a common stalk, or midrib, by its own stem. Simple leaves are sometimes deeply cut into lobes, as in the case of the oak and maple. Compound leaves are said to be *pinnately* divided when the leaflets are arranged along the sides of the midrib, and *palmately* divided when they radiate from the petiole. The terms *pinnate* and *palmate,* as indicated by the illustration on page 3361, refer to the shape of the leaf; the one is derived from the Latin *pinnatus,* meaning *feathered;* the other, from *palmatus,* meaning *marked with the palm of the hand.*

Ruskin, quoted above, has described, in his picturesque fashion, the wonderful variety of form assumed by the foliage of the plant kingdom.

Star-shaped, heart-shaped, spear-shaped, arrow-shaped, fretted, fringed, cleft, furrowed, serrated, sinuated, in whorls, in tufts, in spires, in wreaths, endlessly expressive, deceptive, fantastic, never the same from foodstalk to blossom, they seem perpetually to tempt our watchfulness and take delight in outstripping our wonder.

Some of the most familiar forms of the leaf blades and their marginal variations are shown in the picture on page 3361, and leaves also vary greatly in size, ranging from the minute forms of such plants as the arbor vitae to the giant leaves of many water plants and palms. The leaves of the Victoria regia, a plant found on the lakes of Guiana and Brazil, are six feet in diameter, large enough to provide a standing-place for waterfowl while watching for their prey. A Central American palm of the arum family has been known to bear leaves thirteen feet long.

According to the character of their veining, leaves are said to be *netted-veined* and *parallel-veined.* When all the veins of a netted-veined leaf rise from a single rib the leaf is pinnately-veined, and when they run through the blade like the toes of a web-footed bird, the leaf is palmately-veined. Parallel-veined leaves, also, are of two types, those in which the threads run lengthwise through the blade, and those with parallel veins extending from the midrib to the margin (see illustration). The two general types of leaf arrangement on the stem, *opposite* and *alternate,* are also shown in the illustration.

The Work of the Leaf. The most important function of the leaf is the manufacture of sugar and starch for the nourishment of the plant. This is a process which, in some marvelous way not fully understood, takes place through the breaking up of water and carbon dioxide into their elements. Carbon dioxide is absorbed from the air through the openings in the epidermis; inside the leaf cells is also found a supply of raw material, consisting both of carbon dioxide and water. Energy from the sun's rays is absorbed by the chlorophyll (green coloring matter) in the leaf, and this energy is the power which breaks up the raw material into carbon, hydrogen and oxygen. These gases are then united into new compounds, which, after certain chemical changes, become starch and sugar. During the process some of the oxygen passes into the atmosphere. This marvel of plant life can take place only in the sunlight and is characteristic only of plants that contain chlorophyll. It is a function not possessed by plants that

live on others (see PARASITES), or by those, like molds, toadstools and yeast, which live on decaying organic matter.

It is frequently said that the leaves are the lungs of plants. This means that leaves, through their *stomata* (small openings), absorb oxygen and give off carbon dioxide, in the same manner as do animals through their lungs. The amount of oxygen absorbed and of carbon dioxide given off, however, is very small compared with the amount of each gas passing in the opposite direction during the starch-making process. Furthermore, the interchange of gas in the breathing of plants is not the fundamental part of that function. What is of importance is the decomposition of complex substances, and the consequent release of energy. This energy the plant uses to carry on its work. A comparison of the breathing process of plants and animals shows that carbon dioxide, a deadly poison to animals, is essential to the life of plants. Just as animals cannot live without oxygen, so plants would perish without carbon dioxide. Though some oxygen is taken in by the leaves in the process of respiration, it is but a small proportion of the carbon dioxide absorbed by them in starch-making.

A third function of the leaf is that of *transpiration,* or the giving off of water into the air. By experimenting botanists have discovered that surprisingly large amounts of water are given off by various plants through their leaves: 2,250 gallons were transpired in a single summer by a beech tree 110 years old; an oak tree having 700,000 leaves gave off each day about 180 gallons; and during four months of the growing season an acre of cabbages gave off 500,000 gallons. This moisture represents the surplus water of the crude sap which circulates through the tissues of the plant.

In hot, dry weather plants sometimes wilt because they are giving off more water than they are securing from the soil, and the devices they use at such times are interesting examples of adaptation to conditions. The leaves of a corn plant, for instance, often roll up into tubes to keep the plant from wilting, for a curled leaf exposes much less surface to evaporation than one whose blade is fully expanded. Nurserymen keep the branches of young orchard and shade trees well pruned partly to help maintain a balance of the water supply, for if the leaves are permitted to grow too profusely the trees will lose more moisture than they can absorb through their roots.

Why the Leaves Fall. In the tropical regions trees usually keep most of their leaves the year round, and this is true also of such northern evergreens as the pines, spruces, etc. But the greater number of the common forest trees that grow in temperate climes pass through the long winter months without their leafy garments. There are two important reasons for the fall of the leaf. During the cold season, when the ground is near or at the freezing temperature, the roots of a plant are unable to absorb much soil-water, and if the broad-leaved trees retained their foliage the leaves would give off so much water the trees would dry up and die. Furthermore, in countries where there is heavy snowfall, the branches of the trees would become overburdened with snow if the leaves remained on them, and would consequently suffer injury.

Important changes take place in the cells of the leaf before its work is over, for its valuable food materials are absorbed by the branches and roots to be used again the following spring. Across the base of its petiole a layer of cork cells forms, and at the proper time there is a break at this point. Then the leaf falls to the ground, forming, with thousands of its fellows, a protective blanket for the roots of the tree. Even the dead leaves are useful; the rains dissolve out their mineral contents and these help in the fertilizing of the soil. It is a pretty fancy that the gorgeous colors of the "painted autumn leaves" are the work of the frost, but scientists tell us that the leaf turns red or golden because of the chemical changes that take place in its cells as it is reaching the end of its period of activity.

In Decorative Art. Leafage is a favorite form of decoration in wood carving, pottery, ornamental sculpture and architecture. The conventionalized acanthus leaf (see ACANTHUS) is the characteristic decoration of the Corinthian column, one of the classic forms in Greek and Roman architecture (see COLUMN). The vine, olive, laurel and ivy were other popular leaves used in Greek and Roman ornamentation, and the lotus leaf appears frequently in Egyptian art. B.M.W.

LEB'ANON, MOUNTAINS OF, a mountain range of Syria extending for 100 miles parallel to the eastern shore of the Mediterranean Sea, on whose slopes in Bible times flourished the famous "cedars of Lebanon" that King Solomon used in the building of the Temple (see *I Kings,* V). So inseparably is the cedar associated with these mountains that the name

Lebanon, wherever used, suggests this fragrant and beautiful evergreen tree; moreover, the species which clothed the slopes of the Syrian range has become the most widely known of all the cedars (see CEDAR, subhead *Cedars of Lebanon*). The poet Spenser has quaintly expressed, in the following lines, the kinship between tree and mountain:

> High on a hill a goodly Cedar grewe,
> Of wond'rous length and streight proportion,
> That farre abroad her daintie odours threwe;
> 'Mongst all the daughters of proud Libanon,
> Her match in beautie was not anie one.

The name is derived from the Semitic *laban,* meaning *to be white,* and is supposed to refer to the bare, white walls of chalk or limestone that form a striking feature of the entire range. The Mountains of Lebanon extend northward from the River Litany, or Leontes, which empties into the Mediterranean near Tyre, to the stream called Nahr el-Kebir, north of Tripoli. East of this chain, and extending parallel to it, is the range known as Anti-Lebanon, the two being separated by a narrow, fertile valley.

The Lebanon is the loftier of the two ranges, having an average elevation of from 6,000 to 7,000 feet, while the summits of its highest peaks, Dahr el-Kodib, el-Miskiyeh and Jebel Makmal, are over 10,000 feet above the sea. On the barren and desolate slopes only a few groves of the famous cedars may now be seen. A narrow-gauge railway extends over the mountains from Beirut to Damascus.

LEBANON, PA., the county seat of Lebanon County, is situated in a rich iron ore region in the southeastern part of the state. It is sixty-six miles northwest of Philadelphia and twenty-six miles northeast of Harrisburg, and is on the Philadelphia & Reading, the Cornwall & Lebanon and the Cornwall railroads, and on interurban lines. The population, which in 1910 was 19,240, in 1916 had increased to 20,779 (Federal estimate).

The city is in the fertile Lebanon Valley, between the Blue and South mountains. Iron ore from the Cornwall mines, five miles distant, and limestone and brick clay taken from the near-by hills give rise to the principal industries of the city. These include furnaces and foundries, rolling-mills, steel plants, extensive nut and bolt works, iron and steel plants, machine shops and brick-making plants. There are also shoe factories, silk, knitting and textile mills, and a creamery.

Lebanon contains a Federal building, courthouse, city hall, armory, Y. M. C. A. building, public library and hospitals, and in addition to the public schools a business college and school of telegraphy.

German emigrants settled at Lebanon in 1700. The borough, platted by George Steitz in 1750, was first called Steitztown. It was incorporated as a borough in 1820 and chartered as a city in 1885. The commission form of government was adopted in 1913. F.W.T.

LECKY, *lek'i,* WILLIAM EDWARD HARTPOLE (1838-1903), an historical writer, whose works rank among the most interesting and valuable literary products of his time. His *History of the Rise and Influence of the Spirit of Rationalism in Europe,* published in 1865, attracted a great deal of attention, and has done more than any other of his works to perpetuate his fame. His *History of European Morals from Augustus to Charlemagne* appeared in 1869. More than one-third of the first volume is devoted to a discussion of the intuitive character of morality. His essay on the *Conversion of Rome* was the subject of much scholarly and theological debate and helped to make the book a subject of wide popular interest. In 1878 he published the first two volumes of a *History of England in the Eighteenth Century;* six more volumes, completing the work, were published within the next ten years. In 1891 Lecky published a volume of poems, and in 1896 a two-volume work, *Democracy and Liberty.* He was a native of Ireland, and received his education at Trinity College, Dublin. He represented the University of Dublin in Parliament, and later was honored with membership in the Privy Council, from which he resigned in 1902.

LECOMP'TON CONSTITUTION, in United States history, a constitution adopted by a convention held at Lecompton, Kan., in 1857, when the antislavery struggle was at its height. According to this constitution, slavery was to be legalized in Kansas, the legislature could not pass any act of emancipation, and the constitution itself could not be amended for seven years. The people were allowed to vote only upon the question whether they would have the "constitution with slavery" or the "constitution with no slavery," and as most of the free-state men declined to vote in the election, the "constitution with slavery" was adopted. In January, 1858, in an election held under the auspices of the free-state legislature, the instrument was rejected. Congress having ordered another vote on the question before Kansas should be admitted to statehood, the

Lecompton Constitution was again rejected in August, 1858, and in the following year an anti-slavery constitution was adopted. See KANSAS, subhead *History*.

LE CONTE, *le kont'*, JOSEPH (1823-1901), an American scientist and teacher, known in two hemispheres for his work in popularizing geology. He was born in Liberty County, Georgia, became the pupil of Agassiz in 1850 at Harvard University, and accompanied him on a scientific expedition to Florida. His most active scientific career began in 1868, when he was called to the University of California as professor of geology. He made contributions to geology and zoölogy, and wrote a great many papers and books on the theory of evolution and the relations of science to religion. Among his works are *Religion and Science; Elements of Geology; Compend of Geology; Evolution: Its Nature, Its Evidence and Its Relation to Religious Thought.*

LEE, CHARLES (1731-1782), an American military officer whose inglorious record during the Revolutionary War culminated in his dismissal from the service, following his court-martial for misconduct at the Battle of Monmouth (see MONMOUTH, BATTLE OF). He was born in England and served in the British army before he joined the colonial forces, being one of Braddock's officers in the disastrous expedition against Fort Duquesne (which see). Two years before the opening of the Revolution he emigrated to America, joined with the patriots in their struggle against Britain, and in 1775 was appointed senior major-general, next in rank to Washington. The following year, while in command of the Southern Department, he was given credit for the brilliant defense of Charleston, S. C., though the honors fell properly to William Moultrie (which see).

From this time on Lee was a hindrance, rather than an aid, to Washington. By refusing to attack the left wing of the British, at the Battle of Monmouth (1778), as commanded by his superior officer, he almost caused the utter rout of the Americans, Washington's timely arrival being the only thing that saved the day. Court-martialed for disobedience, he was suspended from his command for a year, and soon after was dismissed from the army for writing a disrespectful letter to Congress.

LEE, HENRY (1756-1818), an American soldier and statesman of the Revolutionary period, whose activity in scouting and outpost duty won him the name of LIGHT-HORSE HARRY. He also was the originator of the well-known phrase, "First in war, first in peace, first in the hearts of his countrymen," spoken by him in a funeral oration delivered before Congress after the death of Washington.

Henry Lee, who belonged to the famous Lee family of Virginia, was graduated from Princeton College two years before the colonies and the mother country began hostilities, and soon after the outbreak of the war he offered his services in behalf of the American cause. For three years after 1777 he was one of the most efficient scouts in the army, and in 1779 figured in a daring exploit, the surprise and capture of the British post at Paulus Hook, that won him the thanks of Congress. In 1780, having attained the rank of lieutenant-colonel, he led his band of cavalry troops, the famous "Lee's Legion," into the South. There his horsemen formed the rear guard of the American forces during General Greene's retreat through the Carolinas, and highly distinguished themselves at the Battle of Eutaw Springs.

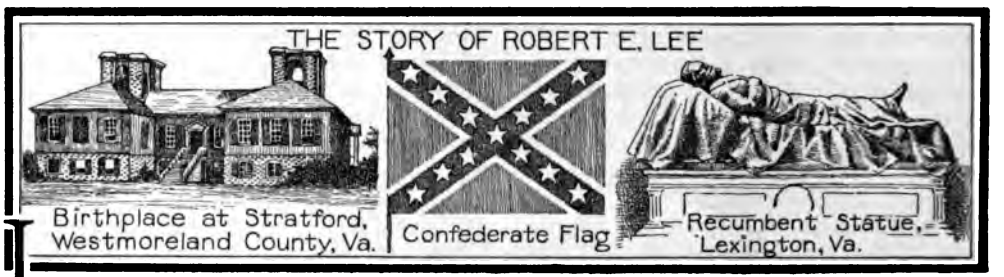
After the war Lee turned his attention to politics. He was a delegate to the Continental Congress and to the Virginia convention which ratified the Federal Constitution, served as governor of Virginia from 1792 until 1795, and while holding the latter position took charge of the troops sent by President Washington in 1794 to crush the Whisky Insurrection (which see). In 1799 he entered Congress, retiring to private life in 1801. Shortly after the outbreak of the War of 1812 he was appointed major-general, but before he could resume his military duties he received a severe wound while helping to quell a political riot in Baltimore. From the effects of this injury he never recovered.

RICHARD HENRY LEE

LEE, RICHARD HENRY (1732-1794), a statesman and patriot of the Colonial and Revolutionary period, who won fame as the author of the resolution which led to the adoption of the Declaration of Independence (which see). He was born at Stratford, Va., and was educated in England. From the beginning of the struggle against Great Britain he was actively in sym-

pathy with the colonists, and was a recognized leader in the first Continental Congress, assembled at Philadelphia in 1774, in which he sat as a delegate from Virginia. He prepared such able addresses to the king, the people of England and the colonies that the Earl of Chatham (William Pitt) declared that "for solidity of reasoning, force of sagacity and wisdom of conclusion, under such complication of circumstances, no nation or body of men could stand in preference to the general Congress at Philadelphia."

The most celebrated of all Lee's speeches was made on June 7, 1776, when he introduced before the Congress at Philadelphia the celebrated motion that "these united colonies are, and of right ought to be, free and independent states, absolved from all allegiance to the British Crown." In 1784 he became president of Congress, and was elected to the Senate for Virginia after the Federal Constitution was adopted. In 1792 he retired from public life because of ill health. His oratorical powers were remarkable.



LEE, ROBERT EDWARD (1807-1870). All critics agree that Robert E. Lee, commander-in-chief of the armies of the Confederacy, was one of the greatest generals the United States has ever produced; many believe him to have been the greatest. But so beautiful was his personal character that the fame which has grown steadily since his death has taken as much notice of that as of his military achievements in the face of the most heartbreaking difficulties. "Ideal soldier" he was, but "perfect man" no less, one writer has declared; and the North against which he fought with all the energy of his nature now holds him in as loving remembrance as does the South which he served.

Early Life. "When should the education of a child begin?" someone once asked Oliver Wendell Holmes. "Two hundred and fifty years before he is born," was the instant reply; and the life of Lee is perhaps the best example in all American history of what beginning a man's education two hundred and fifty years before he is born can do for him. His family, in England and later in the colony of Virginia, was illustrious in peace and in war, the names of Francis Lightfoot, Richard Henry and Henry Lee standing out prominently in colonial and Revolutionary history. The last-named, the famous cavalry leader best known as "Light-Horse Harry," was the father of Robert E. Lee, who was born on January 19, 1807, at Stratford, Westmoreland County, Virginia. He grew up with a passionate devotion to his native state, which was then the leader among all the states, and that devotion he showed to the end of his life.

Sent in 1825 to the military academy at West Point, he passed his four years there without receiving a demerit or even a reprimand, and was graduated second in his class. Two years later, on June 30, 1831, he married Mary Parke Custis, the great-granddaughter of Washington's wife, and toward her he showed all his life a most beautiful devotion. In 1834 he became assistant to the chief engineer of the army at Washington, and later superintended the construction of defensive works in New York harbor.

From the Mexican War to the War of Secession. During the Mexican War his services were so brilliant that he not only attained the brevet rank of colonel (see BREVET), but received the fullest commendation from General Scott, who is reported to have declared that his "success in Mexico was largely due to the skill, valor and undaunted courage of Robert E. Lee, * * * * the greatest military genius in America." After spending three years at engineering work in Baltimore, Lee became, in 1852, superintendent at West Point, and in his three years' term left a decided impress upon the institution. Made lieutenant of cavalry in 1855, he spent the greater part of the

next six years in Texas, away from his beloved Arlington, but happened to be at home in 1859 at the time of John Brown's raid, and was placed in command of the troops sent to suppress it. This accomplished, he returned to his regiment and there remained until 1861, when Texas seceded, and he was summoned home.

Lee was opposed to the breaking up of the Union; he felt that slavery was an even "greater evil to the white than to the colored race;" and he had several years before freed the few negroes which he had inherited; but loyalty to his state made him refuse the command of the United States army when it was offered him in April, 1861, and he accepted the leadership of the army of Virginia. It caused him the greatest grief to part from his companions in arms, for he had always felt "that the cordiality and friendship in the army was the great attraction of the service," and the break with General Scott, his commander-in-chief, was particularly hard. Appreciating his military genius, President Jefferson Davis very

ROBERT E. LEE

shortly raised him to the highest rank in the Confederate army.

The Great Struggle. For a time Lee had no army under his command, but remained with President Davis as his military adviser and thus had no active part in the first Battle of Manassas, though his plans were in large part responsible for its success. Later in the summer of 1861 he took the field, but not for almost a year was he engaged in any movements of primary importance. Then, in June, 1862, he took command of the Confederate armies in the Peninsula, and in a series of sharp engagements in the neighborhood of Richmond drove the Federals from the Confederate capital.

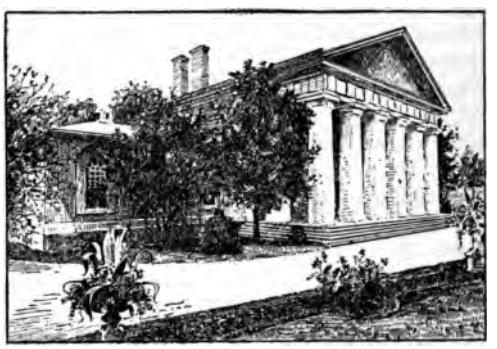
Afterwards he turned his attention from McClellan toward Pope, who commanded the Federal army in Western Virginia, and on August 29 and 30 he and "Stonewall" Jackson won a decisive victory over Pope—the second Confederate victory of Manassas, or Bull Run. Assuming the offensive, Lee next crossed into Maryland with the intention of threatening Washington, but his army was checked at Antietam, and he was compelled to retreat across the Potomac (see ANTIETAM, BATTLE OF).

On the Defensive Again. Intrenched at Fredericksburg, Lee awaited the Federal army, which was again being directed against Richmond. Burnside, the Federal commander, attacked on December 13, and Lee's army drove him back with great loss, but Lee was unable to take advantage of his victory because the Federals had been so placed that they could fall back without endangering their line of communication. Lee knew that the Confederate reserves in men and in supplies were shrinking rapidly, and that victories which simply held the enemy's forces but did not destroy them were too costly to be indulged in. Yet another defensive battle had to be fought, and on May 2-4, 1863, at Chancellorsville, Lee won over Hooker one of his most brilliant victories. Lee suffered in this battle an irreparable loss, for Stonewall Jackson, his most efficient aid, was fatally wounded by some Confederate marksmen, who fired upon him by mistake.

A Losing Fight. Determining now on a more aggressive campaign, Lee led his forces into Pennsylvania, and on July 1 began the most famous conflict of the war—the Battle of Gettysburg. In three days of fighting he showed the most distinguished ability and his army the utmost bravery, but they were overborne by the Federals under Meade, and were compelled to retreat across the Potomac. The greatness of Lee's character was as evident in this defeat as in his most brilliant victories, for he insisted on taking upon himself all the blame for the failure of the campaign, just as at Chancellorsville he had given all the credit for the victory to Jackson.

After a hard winter, Lee's forces found themselves in the spring of 1864 called upon to face a new Federal leader—the determined General

Grant; and during May and the early part of June there occurred in the "Wilderness" a series of the fiercest and bloodiest engagements of the war. The Federals lost more men than the Confederates, but they had greater reserves and more abundant supplies. Later, during the protracted siege of Petersburg, this costly warfare continued, Lee being unable at any time to gain a permanent advantage, not because of inferior generalship, but because of inferior



ARLINGTON

The mansion on the heights above the Potomac River, overlooking the city of Washington. It was for many years the home of Lee, but was taken by Federal troops during the War of Secession.

numbers. Finally, abandoning Petersburg and Richmond, Lee retreated, and at Appomattox Court House on April 9, 1865, surrendered to General Grant. Never, throughout the struggle, were his dignity and true greatness more evident than in the way he met this final failure of the cause for which he had striven; the generous Grant did all in his power to spare Lee humiliation.

Attitude of Lee's Soldiers. Never was a commander more devotedly loved by his soldiers, and never with greater reason; their loyalty was shown most strikingly in this hardest hour of his life. Says a recent biographer:

When Lee returned to his own lines, he was received with a shout of welcome, which died into a sad silence when his recent mission was recalled. With head bare and tears flowing down his cheeks, he said, "Soldiers, we have fought through the war together. I have done the best for you I could." The men crowded about him. Many wept; while hundreds attempted to take his hand or touch his person or even his horse—

that famous horse, "Traveler," which had been his companion throughout the war and which he looked upon as a real friend.

MONUMENT AT RICHMOND

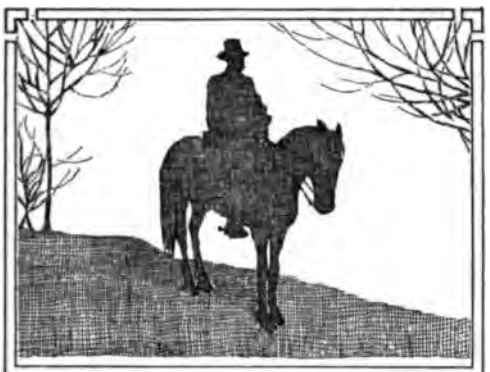
Last Years. For the first time in forty years Lee was then a private citizen, but his services to his country were not over; for his dignified, manly acceptance of the state of affairs did more than all the Federal garrisons to bring the Southern people everywhere to a like point of view. He refused to accept any office in his own state, fearing that his appearance might inflame sectional bitterness, and he did all in his power to spread a kindly feeling toward the North—a feeling none too natural at that time because of the character of most of the Northerners then active in the South.

On August 5, 1865, Lee was offered the presidency of Washington College, at Lexington, Va., now Washington and Lee University. After considering the proposition several days, he accepted the offer as he himself declared, to "educate Southern youth into a spirit of loyalty to the new conditions." He was inaugurated October 2, 1865. The institution grew under his guidance, and he was as popular with the students as he had been with his soldiers, no student being tolerated by his fellows if he refused obedience to any of the president's requests.

But his services there were brief, for his health failed early in 1870, and a visit in the South failed to bring him any lasting relief. He died on October 12, 1870, after a brief illness, his mind dwelling at the last on his military experiences; for he exclaimed, shortly before the end, "Strike the tent," and then "Tell Hill he must come up." His body was laid in the College Chapel at Lexington, and a Virginia sculptor, Valentine, carved the reclining statue which marks the spot. Not only in the South, but throughout the country, his death was felt as a personal loss. In the words of the distinguished English soldier, Lord Wolseley, there is perhaps as true a picture of him as may be found:

I have met many of the great men of my time, but Lee alone impressed me with the feeling that I was in the presence of a man who was cast in a grander mould and made of different and finer metal than all other men. He is stamped upon my memory as a being apart and superior to all others in every way—a man with whom none I ever knew and very few of whom I have read were worthy to be classed. R.C.B.

Consult Fitzhugh Lee's *Life of General Lee;* Williamson's *Life of Robert E. Lee;* A. A. Long's *Memoirs of Robert E. Lee;* R. A. Brock's *General Robert E. Lee;* J.



Lee's Birthday

SUGGESTIVE PROGRAMS

I

The better rule is to judge our adversaries from their standpoint, not from ours. *Lee.*

Star Spangled Banner
Essay, *Lee's Preparation for His Greatest Work*
The Land Where We Were Dreaming .....*Lucas*
Essay, *Lee's Services to the Confederacy*
Marse Robert's Asleep.....*Valentine*
The Sword of Lee.....*Father Ryan*
Lee's Farewell Address to His Soldiers
The Blue and the Gray.....*Finch*
Essay, *The Years After the War*
The Better Way.....*Coolidge*
Confederate memory gems
Dixie

II

Remember! we are one country now. Dismiss from your minds all sectional feeling and bring up your children to be, above all, Americans. *Lee.*

How Firm a Foundation
(Lee's favorite hymn)
Tributes to Lee
Nobility.....*Alice Cary*
Essay, *Lee's Ancestors*
The March of the Deathless Dead.. .....*Father Ryan*
The Nineteenth of January
Essay, *The Battle of Chancellorsville*
The Conquered Banner...*Father Ryan*
Essay, *Why the North Loves Lee*
After Appomattox
Tenting on the Old Camp Ground

W. Jones's *Personal Reminiscences of Robert E. Lee; Recollections and Letters of Robert E. Lee.*

LEECH, a large division of ringed worms, known also as *bloodsuckers* because of their characteristic habit of sucking the blood of other animals. These worms live for the most part in fresh water, but some inhabit moist, grassy places and others dwell in the sea. They have smooth, segmented bodies, from two to ten pairs of eyes, and digestive and nervous systems of a low order of development. Their sucking organs are two disks, one at each extremity of the body. The best-known leech is the one used for medical purposes, which was considered indispensable in the days when physicians practiced blood-letting to cure almost every ailment. This leech has a mouth in the middle of the front sucking disk, provided with three small white teeth. With these sharp, sawlike projections the worm makes a wound which permits a large flow of blood. Though blood-letting is little practiced at the present time, medical leeches are still imported from Europe into the United States.

LEECHES
Their length is from one-half inch to three or four inches.

LEEDS, *leedz,* a great manufacturing metropolis of England, the fifth town in the kingdom in point of population, situated on the River Aire, twenty-one miles southwest of York. The woolen trade carried on here and in the surrounding towns and villages, especially the ready-made clothing industry, is the most extensive in England, while the iron trade, the manufacture of leather and the making of boots and shoes are almost as important as its woolen activities. General goods to the annual value of over $55,000,000 pass through the warehouses of Leeds every year in normal times. The iron trade in all its branches, including the casting of metal, the manufacture of steam engines, of steam plows and machinery of all kinds, and of mechanical tools, gives employment to more people in Leeds than any other branch of its numerous industries. The tanning establishments, erected on the outskirts, and the boot and shoe workshops are among the largest in the kingdom.

Leeds has always been distinguished for the activity of its political and public life; it has taken a leading part in all the great questions

which have agitated the nation in the present century. The appearance of the town has been greatly improved in recent years. Among the most notable of the newer buildings are the town hall, adorned with portraits and statues of local celebrities; the Royal Exchange; Mechanics' Institute, Central Free Library, and the University of Leeds. Kirkstall Abbey is a fine ruin. Population in 1911, 445,568.

LEEK, a hardy plant belonging to the lily family, with a strong odor somewhat like that of the onion. It is cultivated as a vegetable. The lower part of its leaves is much used in soups and stews, especially in French cookery. The wild plant grows in Eastern Europe and adjacent countries of Asia. The peasants of Europe sometimes plant leeks on their cottage roofs, believing them a protection against lightning. The plant is blanched by covering up the stems with earth, as growth proceeds. The leek is the emblem of the Welshmen, worn on Saint David's Day, March 1. Gardeners sometimes plant leeks in neat patterns which resemble paintings from a distance. They add to landscape gardening on account of their trim and compact form. The plant grows to a height of ten or twelve inches, and bears a purplish flower.

THE LEEK

LEEWARD ISLANDS, a British colony in the West Indies divided into five presidencies under one governor, these being Antigua, Saint Kitts, Dominica, Montserrat and the Virgin Islands, with a total population of 127,536, and an area of 700 square miles. The colony has an executive council nominated by the Crown and a legislative council of twenty, ten nominated and ten elected. The legislative council meets once a year at Saint John, Antigua. The name was applied to this portion of the West Indies from the fact that they are less exposed to the prevailing trade winds than are the groups of adjacent islands. See WINDWARD ISLANDS.

LEGACY, *leg'a si,* a gift of property, especially personal property, by will. The law usually provides that the debts of a deceased man must be paid before legacies can be considered. Gifts of particular objects *(specific legacies)* rank next after debts are paid. If the remainder of the estate is not sufficient to pay the *general legacies,* they are reduced in proportion to their amount.

LE GALLIENNE, *le gal i en',* RICHARD (1866-), a poet, critic, essayist and lecturer, born in Liverpool, England, but since 1898 a resident of the United States. After seven years of business life, following his graduation from Liverpool College, he turned to a literary career, serving for a brief time as private secretary to the actor, Wilson Barrett. In 1891 he became literary critic of the London *Star,* later joining the staffs of the *Daily Chronicle* and the *Speaker.* As the result of a spirited discussion between Le Gallienne and Robert Buchanan on the question, *Is Christianity Played Out?,* the former wrote and published *The Religion of a Literary Man.* After making a lecture tour of the United States and Canada in 1898 he settled permanently in New York. Le Gallienne is the author of much light, graceful verse, contained in such volumes as *English Poems, Odes from the Divan of Hafiz* and *The Lonely Dancer and Other Poems;* the outbreak of the War of the Nations inspired a book of war verse, *The Silk-Hat Soldier.* Among his imaginative prose essays and sketches are *Prose Fancies, The Quest of the Golden Girl* and *The Life Romantic.*

The following lines from his *April* suggest the quality of his lyrical gift:

April, half-clad in flowers and showers,
Walks, like a blossom, o'er the land;
She smiles at May, and laughing takes
The rain and sunshine hand in hand.

So gay the dancing of her feet,
So like a garden her soft breath,
So sweet the smile upon her face
She charms the very heart of death.

LE'GAL TEN'DER, coin or other money which can lawfully be used for the payment of a debt. All gold coins of the United States are legal tender for both public and private payments when not below the standard weight prescribed by law; when reduced below standard valuation they are legal tender in proportion to their weight. The standard silver dollar of 412½ grains is legal payment without regard to the amount, unless otherwise stipulated in the contract. The so-called trade dollar, of 420 grains, is no longer coined and is

not legal tender; nor is any commemorative coin, such as the issue of the Columbian Exposition, nor any foreign coin. The silver coins of the United States, the half dollars, quarters and dimes, are legal tender for sums not exceeding ten dollars. The minor coins, the five-, three- and two-cent pieces and all pennies may be tendered legally for all amounts not exceeding twenty-five cents. However, it should be stated that the two-cent and three-cent pieces are no longer coined. See MONEY.

Canadian Legal Tender. Under the Dominion Currency Act a legal tender may be made in copper coins up to twenty-five cents, and in Canadian silver coins to the value of ten dollars. Dominion notes and gold coins are legal tender to any amount. The British sovereign is legal tender for four dollars, eighty-six and two-thirds cents, and standard American gold coins are legal tender for their face value. During the War of the Nations notes of all chartered banks were made legal tender for any amount.

Tender, in law, a formal offer to pay a debt, or to perform an obligation, which may be either in money or specific articles. A tender of payment does not cancel the debt, for the debtor is still liable for the payment, but it bars all claim to subsequent damages and puts a stop to all interest and costs after the date of tender. The tender must also be unconditional, and if paid in money must be in currency or coin known as legal tender; if delivery of property is tendered it must conform to the contract.

LEGATE, *leg'ate,* from the Latin *legatus,* meaning *appointed,* is a title now confined to the highest diplomatic representatives of the Pope. The Papal legates were at first merely delegates to different divisions of the Church. Sometimes they possessed very high powers, and with the spread of the temporal power of the Pope they began to figure in national affairs. Legates are now of three grades; in the first are the Pope's special representatives *(legate a latere)*; in the second, permanent representatives at foreign capitals (see NUNCIO); in the third, certain archbishops. The dignity of *legate a latere* is restricted to cardinals.

LEGEND, *lej'end,* in modern usage the term applied to an improbable or traditional narrative handed down from the past. The words *legend* and *myth* are sometimes used interchangeably, but strictly speaking the myth deals with supernatural beings, the legend with mortals. The former, too, is usually spread over a wide area, while the latter is apt to be local in character. Legendary tales are interwoven with the early history of all peoples. The first seven kings of Rome, for instance, about whom numerous traditions cluster, are known in history as the *legendary kings.* The Swiss people treasure the legend of William Tell (see TELL, WILLIAM), who typifies the spirit of resistance against a foreign oppressor. Among the well-known legends of literature is Chaucer's unfinished poem, *A Legend of Good Women;* Washington Irving has used the word in the title of one of his most picturesque stories, *The Legend of Sleepy Hollow,* based on the tradition of the Headless Horseman.

Originally the term was applied to narratives connected with religious belief or worship, such as the *Golden Legend* of Jacobus de Voragine, a Dominican monk of the thirteenth century.

LEGENDRE, *le zhahN'dr',* ADRIEN MARIE (1752-1833), a French mathematician who deserves credit for his connection with the establishment of the metric system of weights and measures. He was born in Toulouse, but it was in Paris that he gained distinction. He occupied the chair of mathematics at the military school; in 1783 he became a member of the Academy of Sciences, and in 1785 was appointed to the Bureau of Longitudes. He contributed extensively to the theory of attraction, and was the inventor of the rule of the "least square of errors," explaining a popular mathematical device. His *Elements of Geometry* is well known in France; in a translated form it passed through many editions, and was once a textbook in American schools and colleges.

LEGERDEMAIN, *lej er de mane',* a word meaning *sleight-of-hand,* as used in the performance of conjuring tricks. See CONJURING.

LEG'HORN, in many respects the least Italian of all Italian cities, ranks next to Genoa and Naples as the busiest seaport in the kingdom. It is the capital of Leghorn, the smallest province of Italy, and is situated on the Mediterranean, about sixty-two miles west of Florence. Leghorn hats, made from the straw of wheat growing in the vicinity, and the beautiful coral ornaments which all people admire, are exported from here, as well as marble, olive oil, boracic acid, silk and wine; the exports average £1,500,000 annually. Shipbuilding, too, is an important industry. Leghorn is a very modern city and is well built. Its northwestern portion is intersected by numerous canals, which gave it the name of the "New Venice."

The most interesting of its public buildings include the Cathedral, a Jewish synagogue, the Academy of Sciences, with its library of 40,000 volumes, and the naval academy. The "Tower of the Sculptured Lion," one of the leading landmarks, is the only relic of the days when it was a free port. In season, the sulphur springs and sea-bathing attract many visitors. It was a mere fishing village when it came into the possession of the Florentines in 1421. Since those days it has grown in importance and prosperity, due not so much to its favorable location by the sea, as to its wise legislation and favorable labor conditions. Population of the city and suburbs, 1911, 105,315.

LEGION, *le'jun,* from the Latin *legio,* meaning *a levy,* refers to a multitude, but more commonly means a military force. In modern times it has been applied to organizations of an unusual or uncommon character, such as a distinguished corps of soldiers. The word had no military significance in Bible times, as is shown by the quotation: "And he asked him, What is thy name? And he answered, saying, My name is Legion: for we are many" (*Mark* V, 9).

SOLDIERS OF THE ROMAN LEGION
This group of statuary is a part of the arch of Constantine, in Rome.

The ancient legion of Rome, the organization which made the word popular, was a military body, varying in numbers at different periods. In the time of the republic it consisted of 4,500 men. In the time of Marius it consisted of ten cohorts of infantry; each cohort was divided into three maniples, and each maniple into two centuries. Each legion included sixty centurions, and the same number of optiones, or lieutenants, and standard bearers. The eagle was the standard of the legion.

LEGION OF HONOR, an order of merit, instituted in the year 1802, under the French Republic by Napoleon, for recognition of conspicuous military and civil services. Its aim was to pave the way for the establishment of the Empire by popularizing the idea of personal distinction. The order originally comprised three classes, Grand Officers, Commanders and Legionaries. On the restoration of the Bourbon monarchy the Legion was remodeled and lost most of its original character. There are now five classes —chevaliers, or knights; officers, commanders, grand officers, grand crosses.

BADGE OF THE LEGION OF HONOR

The vast numbers of persons advanced to this order and the lack of merit of many of those on whom it has been bestowed have detracted much from its value. In 1872 its members numbered 69,179. A law was passed in that year that only one new member should be added for every two vacancies, which reduced the membership in the next five years to 59,208. The number of chevaliers is now limited to 25,000, the officers to 4,000, the commanders to 1,000, the grand officers to 200 and the grand crosses to 70. Pensions are paid to members of the order who have served in the army or navy, but not to civilian members. No degrading punishment can be inflicted on a member of the order so long as he belongs to it. The emblem of the Legion of Honor is a white enameled star of five points, bearing an emblematic figure of the Republic, with the inscription *République Française.* On the reverse side are two flags, with the inscription, *Honneur et Patrie* (Honor and Country).

LEGISLATURE, *lej'is la ture,* the lawmaking department of a state or province and, as well, of a nation. Not always is *legislature* the legal term employed, for a constitution may declare its legislative department shall be called congress or parliament, both of which are national legislatures, or shall be known as general assembly, legislative assembly or other

similar name. Only state and provincial governments adopt the less dignified terms. Under whatever title known, the powers and duties of lawmaking bodies are practically the same, varying only to meet local needs. Legislatures are exclusively empowered to make laws and to amend and repeal them.

Usually there are two groups of lawmakers, comprised within two houses variously called senate and house of representatives, assembly and house of commons, or similar terms; these are independent of each other in a few minor respects but are distinctly related bodies for the passage of laws and a unit in the general scheme of government. One house alone cannot enact a law; the concurrence of both houses upon every detail of a bill is necessary.

The two houses of a legislative body in a state or province are usually organized after the manner of the higher lawmaking body of the nation; for example, a state legislature in the American Union finds its admirable pattern in the Congress of the United States. The legislative assembly of two Canadian provinces, Quebec and Nova Scotia, is quite similar in each case to the more important Dominion Parliament, each having two houses; the other seven provinces provide for only one house, called the legislative assembly.

Terms of service of members vary from one year to four, while compensation ranges from a stated sum for each day's actual service to a salary of several thousand dollars per year. In some states the constitution limits the length of a legislative session by depriving members of compensation after forty, fifty or sixty days; another device for shortening a session is a constitutional provision that no new bills may be introduced after a stated number of days.

In cities there is a legislature, although not so called, for a city must have its full complement of local laws, which are termed *ordinances;* the legislative body is the board of aldermen. In a village the like body is called the common council. E.D.F.

Consult Ilbert's *The Mechanics of Law Making;* Bryce's *American Commonwealth.*

Related Subjects. The reader is referred in this connection to the following articles in these volumes:

Alderman	Delegate
Amendment	Diet
Burgesses, House of	Duma
Committee of the Whole	Initiative and Referendum
Common Council	Junta
Congress of the United States	Law
	Lobby and Lobbying
Local Option	Short Ballot
Parliament	Speaker
Pure Food Laws	Statute
Representatives, House of	Veto
Senate	Zemstvo

LEGUMINOUS, *le gu'mi nus,* **PLANTS,** or **PULSE FAMILY,** the second largest family of flowering plants, various members of which are of great economic importance in all parts of the world. Some, such as peas and beans, are valued as food plants. Others are used for medicines, dyes, timber, wood, or ornament.

All have a strange and interesting power of taking nitrogen from the air by means of bacteria which live in wartlike growths on their roots. This power of bringing nitrogen to the soil makes many of the legumes valuable as green manure and cover crops for the improvement of poor soils.

About 7,000 species of leguminous plants are known. Most of them, whether trees, shrubs or herbs, bear their seeds in pods, or *legumes,* hence the family name, which the scientist calls *Leguminosae.* One large order in this family bears flowers which resemble butterflies and is therefore called *Papilionaceae,* from the Latin word for butterfly. The common sweet pea belongs to that order. Other legumes bear irregular, spreading petaled flowers; still others bear blossoms small and regular.

Related Subjects. The following important members of this great family are treated in these volumes:

Acacia	Lupine
Alfalfa	Melilot
Bean	Pea
Broom	Peanut
Clover	Sensitive Plant
Indigo	Sweet Pea
Laburnum	Tamarind
Licorice	Vetch
Locust	Wistaria

LEHIGH, *lee'hi,* **RIVER,** a river rising in the northeastern part of Pennsylvania near Wilkes-Barre, which after a winding course of 120 miles empties into the Delaware River at Easton. The part of the country through which it flows is rich in coal and iron, and by means of locks and dams the river has been made a navigable outlet for these products. The Lehigh Valley Railroad follows its course for the greater part of the way.

LEIBNITZ, *lipe'nitz,* GOTTFRIED WILHELM, Baron von (1646-1716), a German philosopher and mathematician, famous as the discoverer of differential calculus, was born at Leipzig. He was educated in the universities of Leip-

zig, Jena and Altdorf. In 1667 he entered the service of the Elector of Mainz, then the most powerful man in the country; in 1676 became the librarian of the Duke of Brunswick-Lüneburg, a post he occupied until his death. He prepared a history of the House of Brunswick, took an active part in negotiations for uniting the Roman Catholic and Protestant churches, and was the chief founder and first president of the Society of Sciences, afterwards the Berlin Academy. He also prepared for Peter the Great the plan of the famous Academy of Saint Petersburg. In 1712 he was made Imperial Privy Councilor and Baron of the Empire. His last days were spent in poverty and neglect; it was only in later times that his genius came to be fully appreciated. The writings of Leibnitz covered a wide field, including philosophy, theology, law, mathematics, history and politics.

LEICESTER, *les'ter,* noted for the manufacture of plain and fancy hosiery and of boots and shoes, is the capital of Leicestershire, England. It is situated on the Soar River, ninety-seven miles northwest of London. Tradition traces its founding to King Lear. Its present name comes from the Anglo-Saxon *Leirceastre,* meaning *fortress of the Leire,* as the River Soar originally was called. Because of its central position, its transportation facilities, by rail as well as by water, and the development of its industries, Leicester has had a very rapid growth. The city is well built and contains a town hall, adorned with many carvings, a relic of Henry VII's time, new municipal buildings, schools of music and art, and the other public buildings which every modern city now boasts. One of the ornaments of the city is a memorial clock tower, erected in 1868 in honor of Simon de Montfort, the Earl of Leicester, and three other lesser-known personages connected with the district. Population, 1911, 227,240.

LEICESTER, Robert Dudley, Earl of (1532-1588), fifth son of the Duke of Northumberland, companion of Edward VI and Princess Elizabeth. On Elizabeth's accession to the throne he was held in high favor, and by many was regarded as her lover. In 1550 he married Amy Robsart, and was thought to have been an accessory to her murder ten years later. He was created Earl of Leicester and Privy Councilor by Elizabeth, and for a time it was rumored that the marriage of the Queen and Leicester was a certainty. There was great opposition in official circles to such an alliance, and Elizabeth publicly renounced any intention of marrying him. No one knew whether such a union had definitely been decided upon. He offended Elizabeth deeply by his marriage to the Countess of Essex in 1578. See Elizabeth.

LEIF ERICSON, *life er'ik sun.* See Eric the Red.

LEIGHTON, *la'tun,* Frederick, Lord (1830-1896), an English painter, sculptor and scholar, whose art and life were always inspired by the loftiest ideals. He was born at Scarborough, and from early youth was granted every opportunity to perfect himself in the art which he loved. He first won recognition, in 1855, with his painting *Cimabue's Madonna Carried in Triumph through Florence.* During the next five years Leighton lived in Paris and then took up his residence in London. He received a medal of honor for sculpture at the Paris Exposition in 1889, and the universities of Cambridge, Oxford and Edinburgh conferred honorary degrees upon him.

In 1878 he became president of the Royal Academy, and during his tenure of that high office the institution enjoyed a material prosperity and social influence attained under none of his predecessors. He was created Lord Leighton the very day before his death. His most noted sculptural pieces are *Athlete Strangling a Python* and *Sluggard.* His paintings are numerous, each characterized by glowing color and purity and grace of form. *The Music Lesson, The Bath of Psyche, Captive Andromache* and *Ball Players* are but a few of the paintings bequeathed to an admiring posterity. In the New York Metropolitan Museum are his *Lachrymae, Lucia* and *An Odalisque.*

LEIPZIG, *lipe'sik,* one of the most prosperous and enterprising commercial and educational centers of Germany. It possesses the second largest German university, is the headquarters of the supreme courts of the empire, and is one of the most prominent literary and musical centers of Europe. In the trades of bookselling and publishing, it occupies first place in Germany, and in normal times surpasses London and Paris in the number and value of its book sales. Over 500 houses are engaged in the book trade, and about 270 newspapers and periodicals are published. The *Baedekers,* those indispensable guide books to travelers, are printed there. Wood carving and paper making are also important industries. The city is a world market for furs, and it manufactures much leather.

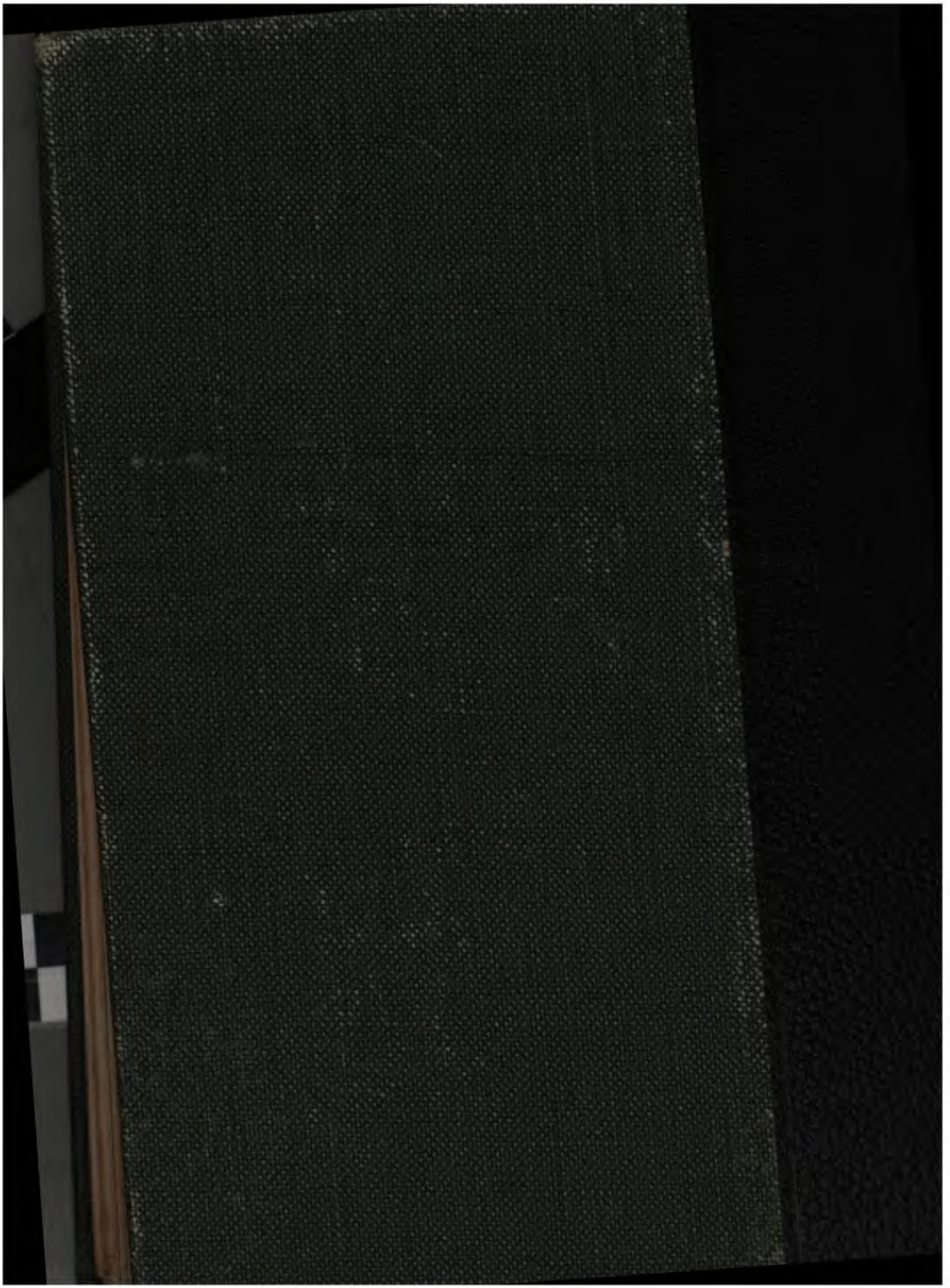
This interesting city is situated three miles above the junction of three small streams, the Elster, Pleisse and Parthe, and is seventy-four miles northwest of Dresden. It is 111 miles southwest of Berlin, about 500 miles northeast of Paris and about 560 miles east of London. The inner part of the ancient town, which is the hub of the business activity, has narrow streets and quaint houses, and is separated by a fine promenade from the more extensive modern suburbs, which, in turn, are edged by numerous busy manufacturing villages. Many civic improvements were introduced into Leipzig during the latter part of the nineteenth century. Among the imposing modern buildings are the Municipal Theater, one of the finest in Germany; the imperial law courts; and the new Gewandhaus, in which some of the best concerts in Europe are held. Much of its material prosperity has been made possible through its three great annual fairs, lasting from three to five weeks, and held at New Year's, Easter and Michaelmas. Their origin is traced as far back as 1180, and they have attracted as many as 30,000 merchants from Europe and Asia. Transactions to the extent of over $50,000,000 are said to take place at the Easter fair alone. The city's numerous squares and open spaces provide ample means for the stalls and booths of the retail dealers.

In addition to the university, founded in 1408, there are many other educational establishments, including a famous school of commerce and a conservatory of music founded in 1843 by Mendelssohn-Bartholdy, as well as other literary, artistic and scientific institutions. Leipzig was the birthplace of Leibnitz and of Wagner. Bach was director of music there in two of its leading churches, and Mendelssohn was director of the Gewandhaus concerts for six years. One of the scenes of Goethe's *Faust* is placed in Auerbach's Keller (wine vault), in which may still be seen frescoes illustrating the legend used by the poet.

The immediate neighborhood of Leipzig has been the scene of numerous battles, notably the Battle of the Nations in 1813, between Napoleon and the allied forces of Russia, Germany and Austria (see below). Population, 1910, 589,850.

Battles of Leipzig. Three famous battles were fought near Leipzig, two of them in the Thirty Years' War and one in the war with Napoleon. The first, which took place in September, 1631, and resulted in victory for the Swedes and Saxons, under Gustavus Adolphus, over the imperial army under Tilly, was the first important obstacle met by the Roman Catholics in their struggles in Northern Europe. In the second battle of Leipzig, or Breitenfeld, which occurred in November, 1642, the Swedes were again victorious over the Imperialists. The third was the great victory of the allied Prussians, Russians, Austrians and Swedes over the French under Napoleon. This engagement, which is also called the "Battle of the Nations," practically secured Germany's freedom. R.D.M.

LEIPZIG MONUMENT
Commemorating the "Battle of the Nations."

LEITH, *leeth,* the seventh largest town in Scotland. The foreign, colonial and coasting trade of this seaport town is of ever-increasing importance, and it has steamboat communication with London, the north of Scotland, several continental ports and with New York. Leith is situated on the Firth of Forth, two miles north of Edinburgh, with which it is connected by a street solidly lined with buildings; its history is to a large extent associated with that of Edinburgh. Among the newer buildings are the courthouse, custom house, exchange, Trinity House, hospital, Sailors' Home and Saint James's Episcopal Church. Leith Fort is now artillery headquarters in Scotland. Among the manufactures are machinery, sailcloth, ropes, soap, bottles and flour; shipbuilding is carried on extensively, and there is a thriving trade in distilled liquors and fishery products. Population, 1911, 80,490.

LELAND STANFORD JUNIOR UNIVERSITY, a coeducational institution, at Palo Alto, California (post office, Stanford University, Cal.), thirty-three miles south of San Francisco. It was founded by Leland Stanford and Jane Lathrop Stanford, his wife, in memory of their only son, Leland Stanford, Jr., who died in 1884, at the age of fifteen. The original endowment consisted of about 90,000 acres of land in various parts of the state; the Stanford ranch at Palo Alto, the immediate grounds of the university, includes 9,000 acres. To this landed endowment was added a bequest of $2,500,000 in the will of Mr. Stanford, and the residue of his estate was turned over to the university during her lifetime by Mrs. Stanford, increasing the endowment to approxi-